THE HIMACHAL PRADESH ADMINISTRATIVE SERVICE RULES, 1973

(As amended upto 19th April, 2017)

Shimla-2, the 15th March, 1973

No.7-5/73-DP(Apptt.).- In exercise of the powers conferred by the proviso to Article 309 of the Constitution of India and all other powers enabling him in this behalf, the Governor of Himachal Pradesh is pleased to make the following rules for regulating the recruitment and conditions of service of persons appointed to the Himachal Pradesh Administrative Service:-

1. Short title and commencement:-

   (i) These rules may be called the Himachal Pradesh Administrative Service Rules, 1973.

   (ii) They shall come into force with immediate effect.

2. Definitions:-

   In these rules, unless there is anything repugnant in the subject or the context,-

   (a) "Governor" means the Governor appointed under Article 155 of the Constitution of India for the State of Himachal Pradesh;

   (b) "Government" means the Government of Himachal Pradesh;

   (c) "Commission" means the Himachal Pradesh Public Service Commission;

   (d) "Appendix" means an appendix appended to these rules;

   (e) "Appointment to the Service" means an appointment to a duty post, whether on permanent, temporary or officiating basis, or on probation;

   (f) "Duty Post" means any post specified in the Appendix I or any other post declared as such by Government and includes a temporary post carrying the same designation as any of the posts specified in that Appendix with an identical scale of pay;

   (g) "Member of the Service" means a person-

      (i) who, immediately before the commencement of these rules, was appointed to the Himachal Pradesh Administrative Service as constituted with effect from the 25th January, 1971, under section 40 (1) of the State of Himachal Pradesh Act, 1970 (Act No. 53 of 1970) read with the Government of India, Ministry of Home Affairs Notification No. G.S.R. 43, dated the 06th January, 1971, and holds a duty post, substantively or on probation, or

      (ii) who is appointed to the service in accordance with the provisions of these rules;

   (h) "the service" means the Himachal Pradesh Administrative Service; and

   (i) "Recognized University" means any University incorporated by law in India or any other University which is declared by the Government to be a recognized University for the purposes of these rules.

3. Number and character of posts:-

   (1) Members of the Service shall be eligible for appointment to the posts given in Appendix I and any other post declared by Government as duty post.

(2) The permanent authorized sanctioned strength of the Service on the commencement of these rules shall be as given in Appendix I or as determined by the Government from time to time. [1]

(3) The permanent authorized sanctioned Strength of the service shall be re-examined at the interval of every five years by a cadre Review Committee to be constituted by the Government and make such alterations as it deem fit for determining the authorized sanctioned strength of the service. [2]

4. Nationality of candidates:-

A candidate for appointment to the service must be a citizen of India. [3]

5. Disqualification for selection as candidate:-

No person-

(a) who has entered into or contracted a marriage with a person having a spouse living; or

(b) who, having a spouse living, has entered into or contracted a marriage with any person, shall be eligible for appointment to the service;

Provided that the Government may, if satisfied that such marriage is permissible under the personal law applicable to such person and the other party to the marriage and there are other grounds for so doing, exempt any person from the operation of this rule.

6. Member to be appointed by the Governor of Himachal Pradesh from among selected candidates:-

Members of the service shall be appointed by the Governor from time to time as required from among selected candidates whose names have been duly entered in accordance with these rules in one or other of the registers of selected candidates to be maintained under these rules:

Provided that nothing herein shall affect the appointment to the service of members who were allocated to Himachal Pradesh under notification No. S.O. 439, dated the 24th January, 1971, issued by Government of India, Ministry of Home Affairs under sub-section (4) of section 40 of the State of Himachal Pradesh Act, 1970 (53 of 1970):

Provided further that the officers on Select List framed under Delhi, Himachal Pradesh, Andaman and Nicobar Islands, Civil Service Rules, 1965, before 25th January, 1971, and appointed to officiate against the duty posts before the commencement of these rules, shall continue to hold such officiating appointments, irrespective of the fact whether posts held by them are earmarked for any of the registers mentioned under Rule 8, till they are regularly appointed to the service in accordance with these rules or till the candidates become available for appointment to the service from the said registers or till their names are removed from the Select List, whichever is earlier.

Provided further that appointments to this Service shall be subject to such rules, instructions or orders regarding reservations in the Services for persons belonging to Scheduled Castes or Scheduled Tribes or for certain other classes of citizens as may be adopted or issued by the Himachal Pradesh Government from time to time. [4]

7. Mode of recruitment:-

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[1] Amended vide Department of Personnel Notification No.Per(A-IV)-B(15)-3/79(2012) dated 13th July, 2012

[2] Amended vide Department of Personnel Notification No.1-28/69-Apptt. Dated 21-02-1974

[3] Amended vide Department of Personnel Notification No.Per(A-IV)F(II)2/84-II dated 13-07-1998

[4] Added vide Department of Personnel Notification No.Per(A)-B(15)-8/78 and further amended vide Department of Personnel Notification No.Karmik(Niyukti-I)-B(15)-2/79 dated 16-08-1979

(1) Appointment to the duty posts in the service (Himachal Pradesh Administrative Service) shall be made in the following manner:-[5]

(a) 50 per cent by direct recruitment.

(b) 25% from amongst the Tehsildars who possess Bachelor's Degree or its equivalent of a recognized University and are substantively born on the cadre of Tehsildars of Revenue Department and have two years' continuous service in the grade both in the officiating and substantive capacity; and [6]

(c) 17% from the Block Development Officers who possess Bachelor"s Degree or its equivalent of a recognized University and are substantively born on the cadre of Block Development Officers of Rural Development Department and have two years' continuous service in the grade both in the officiating and substantive capacity; and [7]

(d) 08% from amongst the substantive holders of the following categories of posts who possess Bachelor's Degree or its equivalent of a recognized University and have two years continuous service in the grade both in the officiating and substantive capacity:- [8]

(1) District Panchayat Officer;
(2) Manager, District Industries Centre;
(3) Section Officer, H.P. Secretariat;
(4) District Welfare-cum-Probation Officers;
(5) Assistant Registrar, Cooperative Societies;
(6) Excise & Taxation-Officer;
(7) Assistant Chief Electoral Officer / Electoral Officer;
(8) District Employment Officer;
(9) District Treasury Officer;
(10) District Food & Supplies Controller;
(11) Assistant Controller, Weights &Measures; and
(12) Principal, Panchayati Raj Training Institute.

(2) For purposes of calculating vacancies according to the percentages as prescribed in sub-rule (1), the duty posts held either substantively or on probation in a regular manner before the commencement of these rules by the Himachal Pradesh Administrative Service Officers, shall be excluded.

8. Registers to be maintained:-

The following registers of selected candidates shall be maintained by the Chief Secretary, namely:-

(a) Register A-I of Tehsildars selected as candidates;
(b) Register A-II of officers mentioned in clause (c) of sub-rule (1) of rule 7, selected as candidates;
(d) Register B of persons selected as candidates as a result of competitive examination.

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[5] Amended vide Department of Personnel Notification No.Per(A-I)-A(3)-3/84 dated 08th October, 1983
[6] Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-1/2010 dated 19th July, 2014
[7] Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-1/2010 dated 19th July, 2014
[8] * Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-1/2010 dated 19th July, 2014.

9. Selection of candidate for register A-I, A-II & A-III:-

Selection Committee:

(1) Recruitment under clauses (b) and (c) of sub-rule (1) of rule 7 shall be made on the recommendation of a Selection Committee (hereinafter referred to as the Committee) consisting of:-

(i) The Chairman or a member of the Commission ……. Chairman

(ii) The Chief Secretary or the Secretary to the Government in the Chief Secretary's Branch …..... Member

(iii) The Financial Commissioner to the Government of Himachal Pradesh (but only for the meeting to be held in March, 1974, the Agricultural Production Commissioner, Himachal Pradesh shall be the member instead of Financial Commissioner) ……..Member

(2) (i) The Committee shall consider from time to time the cases of officers eligible for appointment to the service who have opted for consideration for promotion excepting those officers who have been debarred from consideration in terms of Rule 17 and prepare three separate lists of officers according to the percentage fixed under clause (b) and (c) of sub-rule (1) of rule 7. Each list shall contain the names of the selected candidates twice the number of vacancies available at the time of selection and likely to occur during the next year for each category under clause (b) and (c) of sub-rule (i).

(ii) The selection for inclusion in the lists shall be based on merit and suitability in all respects for appointment to the service with due regard to seniority.

(iii) For purposes of selection of candidates under clause (c) of sub-rule (i) of rule 7 a combined seniority list of all the categories of officers mentioned thereunder shall be prepared on the basis of their length of service in the grade.

(iv) For the preparation of the combined seniority list under clause (iii), the following principles shall be observed even if it may involve a departure from the principle of length of regular service as mentioned in the said clause (iii):-

(a) Inter-se seniority of officers within each category shall be maintained.

(b) For the determination of the inter-se seniority of the incumbents of the posts of the categories mentioned in clause (c) of sub-rule (1) of rule 7 (including the proviso) of the main rules, deemed dates as understood for the purpose of the KLM formula as used in the integration of the services after the re-organization of the Punjab in 1966, shall be made use of wherever necessary.

(c) Wherever in the categories mentioned in clause (c) of sub-rule (1) of rule 7 (including the proviso) of the main Rules, more than one category of posts exist in some Departments and wherever in the notified Recruitment and Promotion Rules of the Department, a channel of promotion was / is provided from one category of such posts to another within the same Department, the eligible incumbents of the lower category shall be placed enblock below the eligible incumbents of the higher category before

'deemed dates' under the KLM formula as laid down in (b) above are applied.

(d) In case of Officers who have had held on an officiating or substantive basis, more than one post included in Rule 7 (1) (c) (Including the Proviso) of the main Rules, the date of appointment in the lowest of such category / post shall be taken into account for determining seniority within the Department according to sub-rule (c) of Rule 9 (2) (iv) irrespective of the fact whether the officer has / has not his / her lien in such post / category.

(e) In case of any doubt or difficulty in the preparation of combined seniority list, the matter shall be decided by the Selection Committee in its discretion and such decision(s) of the Selection Committee shall be final.

Note:- (i) For the removal of doubts, it is declared that any selection / appointment made to the service under the main Rules on the basis of the recommendations of the Selection Committee shall be deemed always to have been valid and in accordance with these rules which shall be deemed to have come into force on 15th March, 1973; provided that the selection / appointment so made are in conformity with these rules.

(ii) Definition: In these rules unless there is anything repugnant in the context, 'main rules' shall mean the Himachal Pradesh Administrative Service Rules, 1973.

(3) The names of persons included in the lists shall be arranged in the order of merit.

(4) The lists so prepared along with the relevant record shall be forwarded by the Committee to the Government. The Government shall send the lists along with the record to the Commission and obtain its concurrence whereafter the lists shall be considered final.

(5) These lists shall remain operative for one year from the date of their approval by the Commission.

9-A. Officiating Appointments:-

(1) The officers approved for officiating appointments under rule 25 of the DHANI Civil Service Rules, 1965, who have not been regularly appointed to Himachal Pradesh Administrative Service, as on the date of the commencement of these rules, shall be appointed to the Himachal Pradesh Administrative Service subject to the condition that they are found fit by the Selection Committee:

Provided that the Officers who are found unfit by the Selection Committee shall be reverted to their substantive posts.

(2) The officers to be appointed under clause (1) above will appear in the seniority list of Himachal Pradesh Administrative Service Officers en bloc below the junior-most officer of the Himachal Pradesh Administrative Service, as on the date of the commencement of these rules, and seniority inter-se of these officers will be in the order in which their names appear in the list referred to in clause (1);

Provided that the officers belonging to the Himachal Pradesh Tehsildari Service may be fixed in their positions in the roster, should that be more beneficial to them.

(3) These rules shall have effect notwithstanding anything else contained in the Himachal Pradesh Administrative Service Rules, or any other rules, orders / instructions governing the Service.

10. Competitive examination to be held yearly for selection of candidates for Register B:

(1) A competitive examination hereinafter called "the examination" the regulations of which are contained in Appendix-III to these rules shall be held at any place in Himachal Pradesh each year as and when notified from time to time for the purpose of selection by competition of as many candidates for the service, as the Governor may determine:

"Before the main examination a preliminary objective type examination based on multiple choice questions is to be conducted so as to shortlist the candidates for the main written examination for HPAS Examination and pattern / regulations for this preliminary examination which will be conducted in one day to be held at any place in Himachal Pradesh each year and shall be as contained in Appendix-III to these Rules."

(2) Notice of the date fixed for the examination shall be published in the Himachal Pradesh Gazette.

(3) The syllabus for the Preliminary Examination of HPAS etc. competitive examination shall be as contained in Appendix-V to these Rules.

11. Admission of candidates to the competitive examination:

(1) Applications for permission to sit at the competitive examination will be called by the Commission and shall be made in the manner and form prescribed, and accompanied by such documents / papers as may be required by the Commission in this behalf.

(2) Unless the Governor otherwise directs, no person shall be permitted to sit at the examination-

(a) who has not attained the age of 21 (twenty one) years and will have attained the age of 35 (thirty five) years on or before the 1st day of January of the year, in which the application(s) are invited by the Commission for competitive examination. [9]

Provided that a candidate belonging to SCs / STs of Himachal Pradesh / Other Backward Classes of HP as declared by the Himachal Pradesh Government from time to time / Children / Grand Children of Freedom Fighters of Himachal Pradesh will be entitled to deduct from his age such period as may, from time to time, be allowed by Government in respect of his / her entry into service under the State. [10]

(b) who does not possess a Bachelor's degree or its equivalent of a recognized University; and

(c) who does not send the examination fee, as fixed by the Government or the agency authorized by the Government, in this behalf from time to time, by the closing date, Examination Fees received after the closing dates, will neither be refunded nor held over for subsequent examination.

(3) A Government servant who is holding substantive / officiating / contractual appointment in H.P. Government or in High Court of Himachal Pradesh or any Court Subordinate thereto and employees of the Public Sector Undertakings / Corporations /

[9] Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-3/84-IV dated 28th December, 2013

[10] Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-3/84-IV dated 28th December, 2013

Banks substantially owned or controlled by the H.P. Government shall be eligible to appear in the examination if he / she possesses a Bachelor's degree of a recognized University and has not attained the age of 45 (forty five) years on the first day of January of the year in which the applications are invited by the Commission for the Competitive examination. Any person who is eligible under this sub-rule and wishes to appear in the examination shall submit his / her application in the prescribed form through his / her Head of Office to the Secretary, H.P. Public Service Commission. [11]

Note-I:

A candidate, who has appeared at an examination the passing of which would render him eligible to appear at this examination but has not been informed of result, may apply for admission to the examination. A candidate who intends to appear at such a qualifying examination may also apply, provided the qualifying examination is completed before the commencement of this examination. Such candidates will be admitted to the examination, if otherwise eligible, but the admission would be deemed to be provisional and subject to cancellation, if they do not produce proof of having passed the examination as soon as passed and in any case not later than two months after the commencement of this examination.

Note-II:

Candidates who have passed the final professional M.B.B.S. or any other Medical Examination equivalent thereto, but have not completed their internship by the time of submission of their applications for the H.A.S. etc. Examination will be provisionally admitted to the Examination provided they submit along with their applications a copy of certificate from the University / Institution that they had passed the requisite final professional medical examination. In such cases, the candidates will be required to produce at the time of their interview original Degree or a certificate from the concerned competent authority of the University / Institution that they had completed all requirements (including completion of Internship) for the award of Degree.

12. Selection of candidates for Register B:

Subject to the provisions of rule 13, the Governor may include in register B in order of merit the names of such number of candidates as he may from time to time determine from amongst those who have been declared as qualified in the examination, by the Commission:

Provided that for purpose of ensuring adequate representation of qualified Scheduled Castes / Tribes candidates, their names may be brought on Register B, in order of merit inter se irrespective of their position on the list of qualified candidates as a whole.

13. Selected candidates for Register B to be declared fit by standing Medical Board before appointment:-

No candidate selected by the Governor under the provisions of rule 12 shall be appointed to the service unless he appears for medical examination before the Standing Medical Board and has been declared by such Board to be physically fit for the duties which he will have to perform as a member of the service.

Note I: The regulations for the medical examination of candidates are contained in Appendix IV of these rules.

Note II: A selected candidate who fails without sufficient reason on which the decision of the Governor shall be final, to appear before the Standing Medical Board on the date for which he is called, is liable to have his name removed from the list of selected candidates for register B.

[11] Amended vide Department of Personnel Notification No.Per (A-IV)-B (7)-1/1998 dated 19th April, 2017

14. Governor of Himachal Pradesh may remove name of selected candidates:-

The Governor may at any time order the removal of the name of any person from a register of selected candidates for any reason which he may deem fit.

15. Appointment of registered candidates to the service:-

The Governor shall make appointments to the service in pursuance of Rule 6 and subject to provisions of sub-rule (5) of rule 9 and rule 12 from among candidates entered on the various registers in rotation as follows:- [12]

1. From Register B	One candidate
2. From Register A-I	One candidate
3. From Register B	One candidate
4. From Register A-II	One candidate
5. From Register B	One candidate
6. From Register A-I	One candidate
7. From Register B	One candidate
8. From Register A-II	One candidate
9. From Register B	One candidate
10.From Register A-I	One candidate
11. From Register B	One candidate
12. From Register A-II	One candidate
13. From Register B	One candidate
14. From Register A-I	One candidate
15. From Register B	One candidate
16. From Register A-II	One candidate
17. From Register B	One candidate
18. From Register A-I	One candidate

and thereafter in the same rotation beginning again from register B:

Provided that all such appointments shall in the first instance be either officiating or substantive provisional;

Provided that percentage of Officers belonging to particular register shall not exceed that provided in Rule 7. The roster will continue to be operative as usual, but the particular roster point of a particular category shall be deemed to have been extinguished in case the prescribed percentage of the said category has already been reached at that point of time. The roster point for the said particular category will, however, be considered for revival at the next point earmarked for that category and in case at that point too there is excess in percentage for that category, the revival of the roster will be postponed to the next point and so on, the real revival being at the stage at which the actual representation to that category falls short of the prescribed percentage.

16. Order of appointment of candidates on the same Register:-

Subject to the provisions of rule 15, candidates on different registers shall be appointed to the service in the order of their selection as candidates.

17. Consequence of failure to join when appointed:-

Notwithstanding anything to the contrary contained in any other Rule of instructions of the Government, if a candidate, on appointment to a particular post is unable for any reason, other

[12] Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-3/84 dated 31st August, 2006

than the orders of the Government to join his appointment within three months from the date of receipt of orders, or within the extension granted for joining on justifiable grounds, he / she shall be ineligible for appointment to the service (HPAS).

18. Seniority of members of the service:-

The seniority of officers appointed to the service shall be determined in accordance with the order of their appointment to the service; provided that-

(a) if the order of appointment of any candidate is cancelled under the provision of rule 17, and such candidate is subsequently appointed to the service the date of his appointment to the service for the purpose of this rule shall be the date of such subsequent appointment;

(b) if any officer appointed to the service fails to qualify himself for substantive permanent appointment within the prescribed period of probation the Governor may determine whether the date of his appointment for the purpose of this rule shall be postponed by a period not exceeding the period by which such officer's substantive permanent appointment is delayed beyond the prescribed period of probation;

(c) the seniority of those Himachal Pradesh Administrative Service Officers allocated to Himachal Pradesh under sub-section (4) of section 40 of the State of Himachal Pradesh, Act, 1970 whose seniority has been finalized and circulated under various letters issued by the Government of India shall remain un-changed.

19. Candidates to pass the departmental examination within two years of Selection:-

(1) Every candidate shall within two years from the date of his appointment to the service pass by the prescribed standard the departmental examination from time to time prescribed for Himachal Pradesh Administrative Service, and if any candidate fails so to pass the departmental examination, his name shall be removed from the register of candidates or, if in the mean time he has been appointed to the service, he shall be removed from the service.

(2) Every person holding a duty post under second proviso to Rule 6 shall also be required to pass the departmental examination within a period of two years from the commencement of these rules.

(3) Persons appointed to the service under proviso one to rule 6 shall also be required to pass within the period of their probation, the departmental examination in the subject(s) in which they have not already qualified under the DHANI Civil Service Rules, 1965;

Provided that the Governor, may in exceptional cases, and for reasons to be recorded in writing exempt any candidate / person from passing the whole or any portion of the departmental examination or may extend the period within which the candidate/ person shall so pass the examination.

(4) The candidate appointed from Register A-I or Register A-II who has attained the age of 55 years on the date of his appointment to the Himachal Pradesh Administrative Service on officiating or substantive provisional basis under rule 15 shall not be required to pass the Departmental Examination as prescribed for the Himachal Pradesh Administrative Service under the Himachal Pradesh Departmental Examination Rules, 1976 for the purpose of confirmation and grant of second and subsequent increments after the first increment.

20. Period of probation and training of candidates on appointment:-

Candidates on first appointment to the service shall remain on probation for a period, in the case of candidates appointed from Register A-I or Register A-II, of eighteen months, and in the case of candidates appointed from Register B, of three years and during such period of probation shall, except in the case of candidates appointed from the Register A-I, obtain a certificate of proficiency in riding from such person or persons as may be nominated by the Governor for this purpose and further shall in the case of candidates appointed from Register A-I undergo such training as the Governor may direct, or, in the case of candidates appointed from other registers including officers holding duty posts under second proviso to rule 6, undergo revenue, settlement, judicial, treasury and general training; provided-

(a) that the Governor may, if he thinks fit, exempt a candidate from undergoing wholly or in part revenue, settlement, judicial, treasury and general training ;

(b) that the candidate appointed from Register A-I or A-II, who has attained the age of 55 years on the date of his appointment to Himachal Pradesh Administrative Service either on officiating or substantive provisional basis under Rule 15, shall be deemed to be exempted from undergoing the training prescribed for the service;

(c) that any candidate may, if he so chooses, with the permission of the Governor, begin his training before appointment to the service, and the Governor may, if he thinks fit, reduce such candidate's period of probation accordingly; and

(d) that the Governor may, if he thinks fit, extend the period of probation of any candidate;

Provided further that the continuous service rendered up to 31.3.1998 by a member of Himachal Pradesh Administrative Service, prior to appointment to the said service under rule 15 on regular basis as selected list officer of the Himachal Pradesh Administrative Service against duty posts of Himachal Pradesh Administrative Service / such ex-cadre posts included in Himachal Pradesh Administrative Service or against deputation reserve of Himachal Pradesh Administrative Service which were declared as such on or before 31.3.1998 shall be taken into account for the period of probation.

21. Officer on probation liable to removal or reversion for unsatisfactory work or conduct:-

Any officer appointed to the service under these rules may during the period of his probation be removed from the service under the orders of the Governor, or reverted to his former appointment if in the opinion of the Governor his conduct is unsatisfactory.

22. Substantive permanent appointment:-

On the completion of the period of probation prescribed by, or determined by the Governor under the provisions of rules 19 and 20, a member of the service shall be qualified for substantive permanent appointment provided he has passed the departmental examination by the prescribed standard.

23. Pay of the service:-

(1) (a) Members of the service / officers officiating in HPAS purely on temporary basis, shall be entitled to pay on scale prescribed by Government from time to time:

Provided that no member of the service / officer officiating in HPAS purely on temporary basis shall be entitled to draw his subsequent annual increments after the first annual increment unless he passes, by the prescribed standard the

departmental examination, excepting those who had been appointment from Register A-1 or A-II to the service or after attaining the age of 55 years.

Explanation:

(i) The stoppage of increments for failure to pass departmental examination shall not be considered to be a penalty.

(ii) The increment or increment(s) shall be released retrospectively on notional basis to a member of the service / or officer, officiating in Himachal Pradesh Administrative Service purely on temporary basis after he has passed the departmental examination and on actual basis from the date of passing the departmental examination, in full.

(b) The pay of members of the service will be fixed where necessary under the provisions of the rules in force in Himachal Pradesh from time to time; Provided that where the increment of a member is withheld for his failure to pass the departmental examination he shall not be entitled, before he passes the departmental examination by the prescribed standard, to the re-fixation of pay on the basis of enhancement in his substantive or officiating pay in the time scale of the post held by him prior to his appointment to the service. However, during this period he may be allowed his substantive pay from time to time if the same happens to be more than his officiating pay in the service.

(2) Members of the service shall be eligible for appointment permanently or provisionally or on officiating basis to a selection grade and on such appointment shall be entitled to pay on a scale sanctioned by the Government from time to time.

(3) The criterion of eligibility for appointment in the selection grade shall be such as may be determined by the Government from time to time.

(4) The number of appointments in the selection grade shall be such percentage of posts, as may be fixed by the Government from time to time:

Provided that the continuous service rendered by a member of the Himachal Pradesh Administrative Service prior to his appointment to the said service under rule 15, as a select list officer of the defunct DHANICS / HPAS / such ex-cadre posts, which have now been included in Himachal Pradesh Administrative Service shall be taken into account for determining the length of service for the award of selection grade of the said service (HPAS).

Provided further that military service of the ex-servicemen who have been appointed to Himachal Pradesh Administrative Service against reserved vacancies under Demobilized Indian Armed Forces Personnel (Reservation of vacancies in Himachal Pradesh Administrative Service) Rules, 1974, which has been taken into account for fixing the seniority in Himachal Pradesh Administrative Service shall be taken into account for determining the minimum length of service for appointment to the selection grade of the said service (HPAS).

Provided further that the continuous service rendered up to 31.3.98 by a member of Himachal Pradesh Administrative Service, prior to appointment to the said service under rule 15 on regular basis as select list officer of Himachal Pradesh Service / against deputy posts of Himachal Pradesh Administrative Service / ex-cadre posts in Himachal Pradesh Administrative Service or against deputation reserve of Himachal Pradesh Administrative Service which were declared as such on or before 31.3.1998 shall be

taken into account for determining the length of service for award of selection grade. / time scale(s).

(5) A member of the service shall be allowed the Special Allowance in addition to pay to which he / she is entitled under sub rule (1) or sub-rule (2), as notified by the State Government from time to time. [13]

Note:- Pension of the members of the Himachal Pradesh Administrative Service will be regulated by the Pension Rules as in force in Himachal Pradesh from time to time.

24. Liability for vaccination and re-vaccination:-

Every member of the service shall get himself vaccinated and re-vaccinated when the Government so direct by special or general order.

25. Publication of grounds for dismissal:-

If a member of the service is dismissed by the Governor for any mis-conduct in respect of which there has been a departmental inquiry or a prosecution in a criminal court, the Governor may publish the reasons for such dismissal if he is of opinion that such publication is required in public interest.

26. Matters not expressly provided in these rules:-

In respect of all matters not specifically mentioned in these rules, the members of service shall be governed by such general rules as may have been or may hereafter be framed by the Government under the provisions of the Constitution of India in this respect.

27. General powers to relax rules:-

Power to relax:-

Where the Government is of the opinion that it is necessary or expedient so to do, it may, by order, for reasons to be recorded in writing, relax any of the provisions of these rules with respect to any class or category of persons in consultation with the Commission.

28. Interpretation:-

If any question arises, relating to the interpretation of these rules, the same shall be decided by the Government.

29. Repeal and saving:-

(1) The 'DHANI" Civil Service Rules, 1965, which were made applicable to Himachal Pradesh Administrative Service under section 40 (6) of the State of Himachal Pradesh Act, 1970 are hereby repealed. (53 of 1970)

(2) Notwithstanding such repeal anything done or any action taken under the Delhi, Himachal Pradesh, Andaman and Nicobar Islands Civil Service Rules, 1965, shall be deemed to have been validly done or taken under these rules.

Sd/-
Chief Secretary to the
Government of Himachal Pradesh

[13] Amended vide Department of Personnel Notification No.Per (A-IV)-B (7)-1/1998 dated 19th April, 2017

Appendix-I
(Rule-3 HPAS Rules)

1. DUTY POSTS		
Sr. No.	Name of the post	Detail of the posts
1	Additional / Joint / Deputy Secretaries in H.P. Secretariat	14
2	Director, Elementary Education, Himachal Pradesh, Shimla	01
3	Director, Health Safety & Regulations, Himachal Pradesh, Shimla	01
4	Additional District Magistrates (Excluding Kinnaur and Lahaul & Spiti).	10
5	Additional District Magistrate (Protocol), Shimla.	01
6	Additional District Magistrate, Pooh, District Kinnaur, H.P.	01
7	Additional District Magistrate, Bharmour, District Chamba, H.P.	01
8	Additional District Magistrate / Additional Deputy Commissioner, Kaza, District Lahaul & Spiti, H.P.	01
9	Resident Commissioner, Pangi at Killar, District Chamba	01
10	Sub Divisional Officers (Civil) (Excluding Pooh Sub Division)	51
11	Sub Divisional Officers (Civil), Padhar, Sangrah and Bangana	03
12	Assistant Commissioner to Deputy Commissioners (Excluding Lahaul & Spiti).	11
13	Assistant Commissioner (Protocol), Parwanoo.	01
14	Assistant Commissioner to Divisional Commissioners	03
15	Deputy Resident Commissioner / Liaison Officer, New Delhi.	01
16	Additional / Joint Director, Land Records	01
17	Assistant Settlement Officers	05
18	Additional / Joint Director, Revenue Training Institute, Jogindernagar.	01
19	Additional / Joint / Deputy Excise & Taxation Commissioner	02
20	Additional / Joint Registrar, (Cooperative Societies), Shimla	01
21	Additional / Joint Registrar, (Cooperative Societies), Kangra at Dharamshala.	01
22	Additional / Joint Director (Industries)	01
23	Additional / Joint Director (SC, OBC and Minorities Affairs Department).	01
24	Additional / Joint Director (Women & Child Development Department)	01
25	Additional / Joint Director (Rural Development)	02
26	Additional / Joint Director (Panchayati Raj)	01
27	Additional / Joint Director (Tourism)	01
28	Additional/Joint Director (Urban Development)	01
29	Additional / Joint Director (HIPA)	01
30	Additional / Joint Director (Ayurveda)	01
31	Additional / Joint Director (Higher Education)	01
32	Additional / Joint Director (Elementary Education)	01
33	Additional / Joint Director (Food, Civil Supplies & Consumer Affairs)	01
34	Secretary, State Transport Authority-cum-Additional/Joint Commissioner (Transport)	01
35	Additional / Joint (Transport) Commissioner-cum-Regional Transport Officer (Hqrs.)	01
36	Regional Transport Officers, Shimla / Mandi / Dharamshala and Kullu	04

37	Regional Transport Officer (Flying Squad) at Dharamshal and Kullu	02
38	Regional Transport Officer, Hamirpur and Solan	02
39	General Manager, District Industries Centre, Solan	01
40	Deputy Chief Executive Officer, Baddi, Barotiwala, Nalagarh Development Authority at Baddi.	01
41	Project Officers (ITDPs), Keylong and Kinnaur.	02
42	Secretary, State Election Commission	01
43	Secretary, State Information Commission	01
44	Additional / Joint Chief Electoral Officer	01
45	Additional / Joint / Deputy Secretary, HP Public Service Commission	01
46	Controller, Printing & Stationery	01
47	Secretary, HP Subordinate Services Selection Board, Hamirpur	01
	Total	145
Deputation Reserve @29%		42
Leave Reserve, Training Reserve and Junior Post Reserve @13%		19
Total Posts		206

Appendix-II

(Rule 23 (b) (5))

TABLE OF POSTS TO WHICH SPECIAL ALLOWANCE IS ATTACHED

OMMITTED VIDE DEPARTMENT OF PERSONNEL NOTIFICATION No.Per(A-IV)-B(7)-1/1998 dated 19th April, 2017.

Appendix-III

(Rule 10 (1))

(NOTIFIED VIDE DEPARTMENT OF PERSONNEL NOTIFICATION No.Per(A-IV)-A(3)-1/2012-II dated 30th June, 2016)

RULES RELATING TO THE SUBJECTS AND STANDARD OF THE COMPETITIVE EXAMINATION OF CANDIDATES FOR THE POST OF HIMACHAL PRADESH ADMINISTRATIVE SERVICE

1. The main examination shall include compulsory subjects and one optional subject. Before this main examination a preliminary objective type examination based on multiple choice questions is to be conducted, the papers / syllabus and pattern of which will be as prescribed in Appendix-V.

2. The candidate shall specify in his / her application form the optional subject he / she desires to take. He / She may intimate any change of his / her intention to the Secretary of the Commission not later than the last date prescribed for the payment of the examination fee. A candidate shall answer the Optional Paper in English or in Hindi as per his / her option.

3. No candidate shall be considered to have qualified the written examination unless he / she obtains atleast 40% marks in compulsory papers of Hindi and English and 45% marks in the aggregate (excluding compulsory papers of Hindi & English).

4. The total number of candidates to be called for interview / personality test on the basis of written examination, shall not exceed three (3) times the number of the vacancies notified for recruitment through that examination;

   Provided that in case there is a tie between or amongst the candidates on account of having obtained equal minimum qualifying marks on the basis of written examination, all such candidates obtaining equal minimum marks shall be called for interview / personality test.

5. The marks obtained by the candidates in the main examination (written part as well as interview / personality test) shall determine their final ranking. Candidates will be allotted various services / posts keeping in view their ranks in the examination and the preference expressed by them for the various services and posts.

6. The compulsory and optional subjects and maximum marks fixed for each subject shall be as below:-

1. COMPULSORY PAPERS

Paper No.	Subject	Maximum Marks
I	English	100
II	Hindi	100
III	Essay	100
IV	General Studies - I	200
V	General Studies - II	200
VI	General Studies - III	200

2. OPTIONAL SUBJECT

Paper No.	Subject	Maximum Marks
VII	Paper-I	100
VIII	Paper-II	100

3. INTERVIEW / PERSONALITY TEST 150

Total of 1 + 2 + 3 1200

Note:- The marks obtained in the Compulsory Papers of English and Hindi will not be counted for overall ranking.

7. The Optional Subjects for the main examination shall be as under:-

1	Agriculture	17	Law
2	Animal Husbandry and Veterinary Science	18	Management
3	Anthropology	19	Mathematics
4	Botany	20	Mechanical Engineering
5	Chemistry	21	Medical Sciences
6	Civil Engineering	22	Philosophy
7	Commerce & Accountancy	23	Physics
8	Economics	24	Philosophy
9	Electrical Engineering	25	Psychology
10	English Literature	26	Political Science & International Relations
11	Forestry	27	Sanskrit
12	Geography	28	Statistics
13	Geology	29	Sociology
14	Hindi	30	Urdu
15	Horticulture	31	Zoology
16	Indian History	-----	----------

8. The standards and contents of papers in general (excluding compulsory papers of English and Hindi) shall be similar to those of the Degree level, i.e. B.A. or B.Sc. etc. examinations of a recognized University. The standards and contents of compulsory papers of English and Hindi shall be of 10+2 level.

9. All Papers shall be of three hours duration.

10. Knowledge of customs, manners and dialects of Himachal Pradesh and suitability for appointment in peculiar conditions prevailing in Himachal Pradesh shall be considered as "desirable qualifications".

11. The marks obtained in the Compulsory Papers of English and Hindi will not be counted for overall ranking though it would be necessary to obtain 40% marks in each of these papers to qualify.

12. Marks and ranking will be decided on the basis of marks obtained in all other compulsory and optional papers (excluding marks of English and Hindi Papers of Compulsory Papers).

13. Credit will be given for good English / Hindi including orderly, effective and exact expression combined with the economy of words, in all subjects of the examination.

14. The names of candidates who are called for interview / personality test shall be arranged in order of merit on the basis of the aggregate marks obtained in the examination.

Note:- In the event of a tie, order of merit shall be determined in accordance with highest marks secured in the interview / personality test and if the marks in the interview / personality test are also equal, then the order of merit shall be decided in accordance with the highest marks obtained by such candidates in the aggregate of the compulsory subjects (excluding English and Hindi papers) and if the marks in the aggregate of the compulsory subjects are also equal, then the order of merit shall be decided in accordance with the highest marks obtained by such candidates in the essay paper and in case there is still a tie then the elder candidate shall be placed higher in the merit.

INTERVIEW / PERSONALITY TEST (150 MARKS)

The candidate will be interviewed by the Commission who will have before them a record of his/her career. He / She will be asked questions on matters of general interest. The object of the interview is to assess the personal suitability of the candidate for the services or service for which he / she has applied to the Commission.

The test is intended to judge the mental calibre of candidate. In broad terms, this is really an assessment of not only his / her intellectual qualities but also social traits and his / her interest in current affairs including the knowledge of customs, manners and dialects of Himachal Pradesh. Some of the qualities to be judged are mental alertness, critical powers of assimilation, care and logical exposition, balance of judgements, variety and depth of interest, ability for social cohesion and leadership, intellectual and moral integrity.

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DETAILED SYLLABUS FOR THE HIMACHAL PRADESH ADMINISTRATIVE MAIN COMPETITIVE EXAMINATION

COMPULSORY PAPERS

PAPER–I: ENGLISH (100 MARKS)

Objectives:

This paper is designed to test candidate's knowledge / aptitude in the following:-

1. Comprehension of English Language;
2. Correct grammatical expression;
3. Clarity and precision in expression Areas of Testing:

Candidates will be tested in the following areas:

1. English Grammar - (20 Marks)
2. Usage and vocabulary - (20 Marks)
3. English Composition Letter / Application / Report / Note writing - (20 Marks)
4. Comprehension of unseen passages - (20 Marks)
5. Precis Writing - (20 Marks)

Evaluation / Marking:

Credit will be given for the following:-

1. Writing of précis, comprehension, composition and usage according to requirements of format.
2. Coherence and sequence in expression.
3. Correctness of grammatical structures.
4. Originality of thought and expression.

PAPER-II: HINDI IN DEVNAGRI SCRIPT (100 MARKS)

(i) Translation of an English passage into Hindi.
(ii) Translation of Hindi passage into English.
(iii) Explanation of Hindi passage in Prose and Poetry in the same language.
(iv) Composition (Idioms, corrections etc.)

PAPER-III: ESSAY (100 MARKS)

Objective:

This paper is designed to test candidate's (i) knowledge / awareness of a variety of subjects and (ii) their ability to compose a sustained piece of writing in the form of an essay.

Contents:

A fair choice of topics covering (i) current affairs (ii) socio-political issues (iii) socio-economic issues (iv) aspects of culture and history and (v) reflective topics will be given to test the candidates' understanding of these issues and their flair for expressing themselves in the English or in Hindi language. The candidates are required to attempt 2 Essays, choosing one each from Section A and B in about 900 words each.

Areas of Testing:

This paper would test the following:

1. Ability to compose a well-argued piece of writing
2. Ability to express coherently and sequentially
3. Awareness of the subject chosen

Evaluation / Marking:

Credit will be given for the following:

1. Observing established rules and format for essay writing
2. Grammatical correctness of expression
3. Originality of thought and expression

PAPER-IV: GENERAL STUDIES-I (200 MARKS)

UNIT-I

SUB UNIT-1

- Historical perspective of Indian Cultural heritage:
- Literature and Art forms from ancient times to 1947 (Major structural and rock-cut temple architecture, sculptural art and major schools of paintings).
- Modern Indian history from mid-18th century to 1980.
- Freedom Struggle: its various stages and the role of eminent personalities from different parts of India.

SUB UNIT-2

- Industrial Revolution and the emergence of Capitalism.
- Fascist Ideology and its global implications.
- World Wars and boundary settlements after the First and the Second World Wars.
- Concept of Decolonization, Nationalism and Socialism, Globalization and concept of Modernity.

SUB UNIT-3

- Emergence and growth of early medieval states: Kangra, Kullu and Chamba. Hill States and their relations with the Mughals and the Sikhs.
- Gorkha invasion- its nature and consequences, Treaty of Segauli.
- Hill States under the Colonial power: Political and Administrative History. Grants, Sanads and territorial aggression.
- Social and Economic conditions under colonial period with special reference to social practices of Beth, Begar and Reet.
- Establishment of British Cantonments.
- National Movement with special reference to Praja Mandal movements in Himachal Pradesh, 1848-1948.
- Five Year Plans and vision for the developed Hill State.
- Survey of artistic and cultural Heritage (Temples, Budhist Monasteries and Paintings).

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-II

SUB UNIT-1

- Introduction to Disasters: Concepts, definitions, disaster classifications including natural and man-made disasters.
- Social and Environmental impacts of disasters.
- Disaster profile of the country.
- Approaches to Disaster Risk Reductions.

- Disaster management models. Roles and responsibilities of stakeholders including community, Concept of first responders.
- Interrelationship of disaster and development.
- Disaster management in India including Disaster Management Act 2005, National and state policies, Plans and institutional mechanism in the country.

SUB UNIT-2

- Geographical Introduction to India, India as a unit of Geographical Study.
- Aspects of the Physical Geography of India – Structure and Relief, Climate, Soils and Vegetation, Geomorphic set up (Mountain Ranges and Rivers and other Water Bodies).
- Human Aspects – Population distribution, Urban Population, Internal Migration.
- Language and Literacy, Villages and Towns in India.
- Settlements, Industry and Transport.

SUB UNIT-3

- Geography of Himachal Pradesh: Relief, Drainage, Vegetation cover and types.
- Climate and climatic zones in Himachal Pradesh.
- Geographical Regions of Himachal Pradesh (Shiwalik, Doons and Low Valleys, Outer Valleys of Sub Himalaya, Mid Hill Tracts of High Himalaya, High hills and Valleys and Inner Zones).
- Human Aspects: Quantitative, Qualitative and Temporal characteristics of Population, Urbanization pattern.
- Policies: Forest, Industrial and Tourism Policies, Growth of Industrial areas and types of Industries in Himachal, Employment generation and potential, Scope of future Industrialization, Hazard Vulnerability and Risk Profile of Himachal Pradesh.

  Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-III

SUB UNIT-1

- Salient features of Indian Society, Unity in Diversity.
- Social Institutions: Family, Marriage, Kinship, Religion and Social stratification in India.
- Women empowerment and social justice: Policies for women Empowerment in India, Laws for protection of women, women security and safety initiatives in India.
- Child Rights and Right to Education.
- Rights of differently-able persons and quality of life for them.

SUB UNIT-2

- Core Values in public service / governance.
- Philosophical basis of public service / governance and Integrity, Professionalism, Accountability.
- Objectivity and Transparency, information sharing and right to information, codes of conduct, work culture, challenges of corruption and political pressures.
- Gandhian Thought: Truth and Non-violence, Satyagraha, Ends and Means, Religion and Politics.

SUB UNIT-3

- Society and Culture in Himachal Pradesh: Culture, customs, fairs and festivals, and religious beliefs and practices, recreation and amusement.
- Tribes of Himachal Pradesh: their historical, social, cultural, economic and legal aspects.

- Family, marriage, kinship, and caste system in Himachal Pradesh.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

PAPER-V: GENERAL STUDIES-II (200 MARKS)

UNIT–I

SUB UNIT-1

- Constitution of India: Historical underpinning, evolution, salient features.
- Significant provisions including Fundamental Rights, Directive Principles of State Policy, Fundamental Duties.
- Amending process and important Constitutional Amendments and theory of basic structure.

SUB UNIT-2

- Parliament and State legislatures, Structure, Organization and functioning of the Union and State Executive and the Judiciary.
- Functions and responsibilities of Union and States, issues and challenges pertaining to the federal structure, devolution of powers and finances up-to local level and challenges therein.
- Salient features of the Representation of People's Act.
- Appointments to various constitutional posts, powers, functions and responsibilities of various constitutional bodies in India.

SUB UNIT-3

- Reorganization and politics of statehood.
- Development of political parties, major Political parties and their support base and performance in the Assembly and Parliamentary elections in Himachal Pradesh.
- Politics of sub-regionalism and pressure groups in the State.
- Structure, organization and functioning of Statutory, Regulatory and various Quasi Judicial bodies in Himachal Pradesh.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-II

SUB UNIT-1

- Institutional framework, Policies and Interventions for development in various sectors in India.
- Governance, Good governance, Citizen Charters, effective public service delivery, transparency, accountability and ethics in governance in India.
- District Administration: Changing role of Deputy Commissioner. •Local self-government in urban and rural areas in India.

SUB-UNIT-2

- Role of Non-Government Organizations (NGOs),
- Self Help Groups (SHGs) and Civil Society in Governance in India.
- Bodies constituted, Policies, Programmes and Schemes for welfare of Scheduled Castes, Scheduled Tribes,
- Women, Minorities, Backward classes, Differently-abled persons, and children in India.
- Issues relating to quality of life: livelihood, poverty, hunger, disease and social inclusiveness.

SUB UNIT-3

- Governance in Himachal Pradesh:

- The Himachal Pradesh Public Service Guarantee Act 2011;
- Right to Information Act, 2005 and rules made thereunder by the Himachal Pradesh Government.
- Administrative reforms for effective public service delivery in Himachal Pradesh.
- Implementation of 73rd & 74th Constitutional amendments in Himachal Pradesh.
- Issues and Challenges. Programmes and policies for the welfare of differently-abled persons, women and children in Himachal Pradesh.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-III

SUB UNIT-I

- Bilateral, Regional and Global groupings and agreements involving India and affecting India's interests.
- India's look east policy.
- India's relations with United States of America (U.S.A.), Russia, China, Pakistan, Bangladesh, Sri Lanka, Afghanistan, Nepal, Maldives and Middle East Countries.

SUB UNIT-2

- Effects of the policies of developed and developing countries on India's interest, Indian Diaspora.
- Important international Institutions, agencies and fora, their structure and mandate.

SUB UNIT-3

- Cyber crime and drug menace – mechanism to detect and control it in Himachal Pradesh.
- Enactments made by Himachal Pradesh Government to protect and promote the interests of agrarian society.
- Various policies framed by the Government of Himachal Pradesh for the socioeconomic development of Scheduled Castes and Scheduled Tribes of the State.
- Tribal welfare administration, Tribal sub plan and Single line administration in Himachal Pradesh.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

PAPER-VI: GENERAL STUDIES-III (200 MARKS)

UNIT-1

SUB UNIT-1

- Characteristics of Indian Economy:
- Demographic Profile, Demographic Dividend and Population Policy.
- Sectoral Composition with respect to contribution to Gross Domestic Product (GDP) and Employment.
- Poverty and Inequality, Unemployment, Inflation in India.
- Industrial Growth in India.
- Regulatory framework for money and banking: Reserve Bank of India (RBI), Commercial banks and Regional Rural Banks.
- Monetary policy, Foreign exchange, Balance of Payment Scenario.
- Foreign Trade: Policy, Composition and Direction, Impact of Liberalization / Privatization and Globalization.

SUB UNIT-2

- Economic Planning in India.
- Five Year Plans: strategies and outcomes, Public / Private / Joint Sectors.
- Fiscal Policy, Fiscal Responsibility and Budget Management Act, 2003, Debt and Investment in India: Current Status, Growth and Development experience including Natural Resource Management.
- Sustainable development and Inclusive growth.
- Measurement of economic development: Physical Quality of Life Index (PQLI), Millennium Development Goals, Human Development Index (HDI) / Gender Development Index (GDI) / Gender Empowerment Measure (GEM).
- Latest / Current Development Schemes / Initiatives / Institutional Changes (e.g. Swach Bharat Mission, Make in India, Digital India, Skill India, Sansad Adarsh Gram Yojana, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), National Institution for Transforming India (NITI) Ayog etc.).
- International Financial and Economic Organizations: International Monetary Fund (IMF), World Trade Organization (WTO), International Bank for Reconstruction and Development (IBRD), International Development Association (IDA), United Nations Conference on Trade and Development (UNCTAD), Organization for Economic Cooperation and Development (OECD), Brazil, Russia, India, China and South Africa (BRICS).

SUB UNIT-3

- Economy of Himachal Pradesh:
- Demographic profile and Human resource, Sectoral distribution of Gross State Domestic Product (GSDP).
- Diversification in Agriculture and allied activities, Land tenure and size of land holdings.
- Industrialization in the state.
- Skilled / Unskilled labour.
- Revenue generation with special reference to hydro potential, tourism, flora and fauna.
- Cottage and Small Scale Industries.
- Tax base, Pros and Cons of Special Category status.
- Appraisal of education, Health, Physical and Financial Infrastructure Development.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-II

SUB UNIT-1

- Applications of space technology in natural resources, development and communications.
- Important missions and programmes of Department of Space and Indian Space Research Organization.
- Historical evolution of Indian Space programme. Lunar, interplanetary and Earth Observation Missions.
- Remote Sensing and Communication satellites. Applications of Remote sensing and Geographic Information System (GIS) for natural resources monitoring and applications benefiting common man.

SUB UNIT-2

- Developments in energy sectors such as Hydro power, non conventional sources of energy and nuclear energy including policies, programmes and research base in the country.

- Concepts of non conventional, renewable, clean and environment friendly energy sources. Role of energy in sustainable development.

SUB UNIT-3

- Modern and emerging technologies and initiatives in the State of Himachal Pradesh Including biotechnology policy, research, vision, scope and applications for developing horticulture, medicinal and aromatic plants resources of the State.
- IT policy of Himachal Pradesh and its role in governance, concept of Himachal State Wide Area Network (HIMSWAN), State plans of e-governance, concept of Lok Mitra Kendra and Aryabhatta Geo-Informatics Space Application Centre (AGISAC).
- State Biodiversity strategy and Action Plan. Endangered and threatened species of Himachal Pradesh. Factors responsible for Bio diversity decline in Himachal Pradesh.
- Relevance and role of Intellectual Property Rights, Geographical Indications and Traditional wisdom and knowledge in sustainable development of the State.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

UNIT-III

SUB UNIT-1

- Issues, concerns, policies, programmes, conventions, treaties and missions aimed at environment protection, and dealing with the problem of climate change.
- State of environment reports. Environment protection and pollution control Act and rules.
- Environment Impact Assessment.
- National Action plans on Climate Change.
- Himalayan ecology, biosphere reserve, Science and economics of climate change.
- Social and ethical issues in use of Biotechnology.

SUB UNIT-2

- Latest developments in science and technology for harnessing agriculture, horticulture, medicinal and herbal resources in the country.
- National mission for sustainable agriculture, mission for integrated development of horticulture.
- Concept of organic farming, seed certification, rain water harvesting, techniques of irrigation and soil conservations and soil health cards.

SUB UNIT-3

- Tourism policy, potential and initiative in Himachal Pradesh.
- Types of tourism: religious, adventure, heritage, Important tourist destinations in Himachal Pradesh.
- Social, Economic and Cultural implications of Tourism.
- Concept of Eco-Tourism and green tourism and their role in sustainable development of the State.
- Environmental concerns of tourism industry, both positive and negative effects including climate change with reference to Himachal Pradesh.

Note:- All the topics / subjects covered under SUB UNIT-3 are relevant to the State of Himachal Pradesh.

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DETAILED SYLLABUS FOR THE HIMACHAL PRADESH ADMINISTRATIVE SERVICE COMPETITIVE EXAMINATION (OPTIONAL SUBJECTS)

AGRICULTURE
PAPER-I

Ecology and ecological niche, their relevance to man, Natural resources, their management and conservation. Physical and social environment as factors of crop distribution and production. Climatic elements as factors of crop growth, global warming, its impact on agricultural production, as indicators of environments. Environmental pollution and associated effect on crops, animals and humans.

Cropping patterns in different agro-climatic zones of the country, Impact of high yielding and short duration varieties on shifts in cropping pattern. Principles of multiple cropping. Multi-storey, relay intercropping - their importance in relation to food production and resource use. Resource conservation technologies. Package of practices for production of important cereals, pulses, oil seeds, fibre, sugar and commercial crops grown in different regions of the country.

Weeds, their characteristics, association with various crops, their multiplication, cultural, biological, chemical and integrated management, herbicide selectivity and resistance.

Processes and factors of soil formation. Taxonomic classification of Indian soils, mineral and organic constituents of soil and their role in maintaining soil health. Problem soils, extent and distribution in India and their reclamation. Essential plant nutrients and other beneficial elements in soils, their forms and factors affecting their availability, functions and deficiency symptoms, nutrient recycling, symbiotic and non-symbiotic nitrogen fixation. Soil fertility evaluation techniques. Application of remote sensing in soil and water resource studies.

Soil and water conservation techniques. Types of wind and water erosion. Erosion and run off processes and factors affecting them. Dry land and rain fed agriculture.

Water use efficiency, conjunctive use of water, quality of irrigation water, criteria for scheduling irrigations.

Farm management, importance and principles, farm planning and budgeting. Integrated farming system, its role in sustainable production system.

Extension and communication methods. Role of traditional and modern communication media in agricultural development. Procedure for development of agricultural extension programme. Factors affecting adoption of farm innovations. Role of Krishi Vigyan Kendra's and extension agents in agricultural development in India.

PAPER-II

Heredity and variation, Mendel's Laws of Inheritance, Cytoplasmic inheritance, Quantitative characters, Plant tissue culture – somaclonal variation, micropropagation and producing cell cultures. Nucleic acid – its structure and types, restriction enzymes, cloning vectors and transformation. Polymerase chain reaction, DNA finger printing and Intellectual Property Rights (IPR) issues.

Origin and domestication of field crops. Morphology and patterns of variations in varieties and related species of important field crops, Causes and utilization of variations in crop improvement.

Application of the principles of plant breeding, methods of breeding of self and cross pollinated crops. Heterosis and its exploitation. Male sterility and self incompatibility, utilization of mutation and polyploidy in breeding.

Seed and seed technology, important types of seeds and their production, processing and testing of seeds of crops and seed certification regulation.

Climatic requirements and cultivation of major fruits plants, vegetable crops and flowers and their package of practices. Horticultural nursery management. Propagation of commercial fruits, vegetables and flowers through different methods. Protected cultivation of horticultural crops. Hi-tech horticulture, handling, post harvest marketing problems of fruits and vegetables, methods of preservation of important fruits and vegetable products, processing techniques and equipments, Role of fruits and vegetables in human nutrition, landscape and commercial floriculture, including design and lay out of lawns and gardens. Medicinal and aromatic plants.

Diseases and pests of fields, vegetable, orchard and plantation crops of India and stored grains; and their management. Classification of plant diseases and pests. Principles of plant disease/pest control and factors affecting their outbreaks. Biological control of pests and diseases. Integrated management of pests and diseases. Pesticides and their formulations plant protection equipment, their care and maintenance. Pesticide pollution in the environment. Development of pesticide resistance in pests and diseases and its management.

Growth and Development of Vegetable Crops – physiology of dormancy and germination of vegetable seeds and tubers.

Post–harvest technology - Maturity and ripening process and factors affecting them. Quality evaluation for fresh market and processing. Factors responsible in deterioration of harvested fruits and vegetables, role of growth substances and irradiation on decay control, respiration and transpiration, storage of fresh fruits and vegetables.

ANIMAL HUSBANDRY AND VETERINARY SCIENCE
PAPER-I

1. Animal Nutrition:

1. Animal Nutrition: energy sources, energy metabolism and requirements for maintenance and production of milk, meat, eggs and work.

1.1 Advanced studies in nutrition-protein- source of protein, its metabolism and synthesis, protein quality in relation to requirements. Importance of energy protein ratio in rations.

1.2 Advanced studies in nutrition-minerals- sources, functions, requirements and their interrelationships including trace minerals.

1.3 Vitamins, hormones and growth stimulating substances-sources, functions, requirements and interrelationship with minerals.

1.4 Advanced ruminant nutrition-Dairy cattle – nutrients and their metabolism with reference to milk production and its composition. Nutrient requirements for calves, heifers, dry and milking cows and buffaloes.

1.5 Advanced non-ruminant nutrition-poultry- nutrients and their metabolism with reference to poultry meat and egg production. Nutrient requirement and feed formulation for broilers at different ages.

1.6 Advanced non- ruminant nutrition- swine- nutrients and their metabolism with special reference to growth and quality of meat production. Nutrient requirements and feed formulation for body, growing and finishing pigs.

1.7 Advanced applied animal nutrition-a critical review and evaluation of feed experiments, digestibility and balance studies. Feeding standards and measure of feed energy. Nutrient requirements for growth. Maintenance and production. Balanced rations.

2. Animal Physiology:

2.1 Growth and Animal Production- Prenatal and post natal growth, Growth curves, measures of growth, factors affecting growth, body conformation, composition and meat quality.

2.2 Milk production, reproduction and diagnosis, Hormonal control of mammary developments, milk secretion and milk ejection, composition of milk of cows and buffaloes. Male and female reproductive organs, use of hormones in animal reproduction and their components and functions. Ruminant and non-ruminant digestion.

2.3 Environmental Physiology: Physiology of adaptation, environmental factors and their effect on animal production and reproduction, methods of controlling climatic stress, animal ecology.

2.4 Semen quality preservation and artificial insemination: Semen and its composition, Chemical and physical properties of ejaculated semen, factors affecting quality of semen in vivo and in vitro. Factors affecting semen preservation, composition and diluents, sperm concentration, transport of diluted semen, freezing techniques of semen in cows, sheep and goats, swine and poultry.

3. Livestock Production and Management:

3.1 Current status of animal husbandry in India / state, prevalent Livestock Production Systems, Comparison of dairying in India and abroad, Scope of dairying in income and employment generation, dairying under mixed, specialized and diversified farming. Commercial and economical dairy farming, starting a dairy farm / dairying enterprise, capital and land requirement, Organizational set up of a dairy farm, Farm budgeting. Procurement of different goods / inputs, Personnel management, factors determining the efficiency of dairy animals, Herd recording, Maintenance of farm records, Routine farm operations, Clean milk production, marketing of milk and other animal products. Pricking policy, Cost of milk production, Concept of organic animal husbandry.

3.2 Feeding practices of dairy cattle, Feed and Fodder requirements of animals / dairy farms, Developing practical and economical rations for animal feeding, Managing round the year supply of greens, recent trends in animal feeding, management and feeding practices of lactating, dry, pregnant animals. Day old and young stock, heifers and breeding bulls. Keeping feeding records.

3.3 Management and feeding practices of other important livestock species (Sheep, Goat, Pigs, Equines, Yaks, Rabbits etc.) and Poultry, generals problems / constraints of rearing these species.

3.4 Feeding of different animals during scarcity period and natural disasters (drought, floods, famine etc.).

4. Milk Technology:

4.1 Organization of rural milk procurement, collection and transport of raw milk.

4.2 Quality, testing and grading raw milk, Quality storage grades of whole milk, Skimmed milk and cream.

4.3 Processing, packaging, storing, distributing, marketing defects and their control and nutritive properties of the following milks: Pasteurized, standardized, toned, double toned, sterilized, homogenized, recombined and flavoured milks.

4.4 Milk Products Technology: Selection of raw materials, assembling, production, processing, storing, distributing and marketing milk products such as Butter, Ghee, Khoa, Channa, Cheese; Condensed, evaporated, dried milk and baby food; Ice cream and Kulfi; by products; whey products; butter milk, lactose and casein. Testing Grading, judging milk products-BIS and Agmark specifications, legal standards, quality control, nutritive properties, packaging, processing and operational control costs.

4.5 Preparation of cultured milks, cultures and their management. Vitamin-D soft and other special milks.

4.6 Legal standards, Sanitation requirement for clean and safe milk and for the milk plant equipment.

5. Meat Technology:

5.1 Physical and chemical characteristics of meat-meat emulsions-methods of preservation of meat-curing, canning, irradiation, packaging of meat and meat products; meat products and formulations.

5.2 By products: Slaughter house by products and their utilization-Edible and inedible by products-social and economic implications of proper utilization of slaughter house by products-Organ products for food and pharmaceuticals.

5.3 Poultry Products Technology: Chemical composition and nutritive value of poultry meat, pre slaughter care and management. Slaughtering techniques, inspection, and preservation of poultry meat, and products, Legal and BIS standards.

PAPER-II

GENETICS AND ANIMAL BREEDING:

1. Principles of Animal Breeding: Introduction to Animal Breeding; probability; Hardy-Weinberg law, its application and significance; phenotypic variance and its partitioning; heritability and its estimation; repeatability; principles of inbreeding; coefficient of relationship; out breeding and heterosis.

1.1 Population Genetics Applied to Animal Breeding: Measured variance of population; approach to equilibrium under random mating; genetic and environmental sub-divisions of phenotypic variance; contrast between Mendelism and blending inheritance; genetic nature of differences between groups; resemblances between relatives in population; mating at random; forces affecting gene frequency; their impact in animal breeding; heritability and repeatability, methods and precision of estimation; aids to selection; breeding for threshold characters; selection index selection.

1.2 Breeding Systems: Biometrical relations between relatives; mating systems; inbreeding; out breeding; phenotypic assortative mating; general and specific combining ability; choice of effective breeding plans; calculation of inbreeding coefficients using Wright's and Malacot's approach; co-variance among relatives; decreases of heterozygosity on inbreeding; problems of detection of non-additive genetic variance.

Current status of hilly livestock; breeding strategies for breeds of hilly tract with particular reference to Gaddi sheep and goat, Biangi sheep, Chegu goat, Spiti, Zanskar and Bhutia breeds of horse, yak and Mithun; conservation methods for the hill germplasm; genotype environment interaction.

Different types of methods of selection, their effectiveness and limitations, selection indices, construction of selection in retrospect, evaluation of genetic gains through selection, correlated response in animal experimentations.

Approach to estimation of general and specific combining ability, dialete, fraction of dialete crosses reciprocal recurrent selection, inbreeding and hybridization.

2. Health and Hygiene:

2.1 Anatomy of ox and fowl histological techniques, freezing, paraffin embedding etc. Preparation and staining of blood films. Common histological stains, embryological of cow.

2.2 Physiology of blood its constituents, circulatory system, respiration, excretion, Endocrine glands in physiology of animal health and diseases.

2.3 General knowledge of pharmacology drugs in Veterinary Therapeutics.

2.4 Vety-hygiene with respect to Water supply (contamination, prevention, purification), Atmospheric pollution, stray and fallen animals. Disposal of sewage and farm refuses fallen animals and control recycling from surplus, wastes etc. Sanitation of animal houses and its effect on animal health and production. Method of prevention and control of air and water borne diseases of man and animal.

2.5 Milk Hygiene.

3. Meat Hygiene.

3.1 Zoonoses and human health.

3.2 Most common cattle and poultry diseases, their mode of spread, prevention and treatment etc. Immunity. General principles and problems of milk and meat infection jurisprudence in Vety. Practice. Medicinal use of synthetic and natural Harmones in Vety. Practice.

3.3 Duties and role of veterinarians in a slaughter house to provide their meat that is produced under ideal hygienic conditions.

3.4 By-products from slaughter houses and their economic utilization.

3.5 Methods of collection, preservation and processing of hormonal glands for medicinal use.

4. Extension: Animal Husbandry development programmes. Operation Flood. Role of cooperatives in dairy development in India, PRA and RRA. TRYSEM. Extension teaching methods and use of audio-visual based teaching. Extension Programme Planning and Evaluation. Transfer of Technology. Diffusion and adoption of technology. Livestock Marketing Extension.

4.1 Different possibilities and methods to provide self-employment to educate youth under rural conditions.

4.2 Cross breeding as a method of upgrading the local cattle.

ANTHROPOLOGY
PAPER-I

1.1 Meaning, scope and historic perspective of Anthropology.

1.2 Relationship with other disciplines: History, Economics, Sociology, Psychology, Political Science, Zoology, Medical Science.

1.3 Main branches of Anthropology, their scope and relevance:-

(a) Social cultural Anthropology;
(b) Physical and biological Anthropology;
(c) Archaeological Anthropology.

1.4 Emergence of Man and Human Evolution:—

I. Emergence of man its time, place and subsequent dispersal of the various continents.
II. Origin and evolution all the sequential stages with features.
III. Principles of systematics and taxonomy, major primate taxa, tertiary and quaternary fossil primates, systematics of Hominoidae and Hominidae.

1.5 Phylogenetic status, characteristics and geographical distribution of the following:-

(a) Plio-pleistocence fossil primates- Oreopithecus
(b) South and East African hominids - Plesianthropus Australopithecus Africa Paranthropus, Australopithecus.

(c) Paranthropus-Homo erectus-Homo erectus javanicus, Homo erectus pekinensis.
(d) Homo Heidelbergensis.
(e) Neanderthal man-La-chapelle-aux-saints (Classical type), Mt. Carmel (Progressive type).
(f) Rhodesian man
(g) Homo-saoiens-Cromagnon, Grimaldi, Chancelede.
(h) Recent advances in understanding the evolution, distribution and multidisciplinary approach to understand a fossil type in relation to others.

1.6 Evolution trends and classification of the Order Primate, Relationship with other Mammal, molecular evolution of Primates, Primate Locomotion; Terrestrial and arboreal adaptation, skeletal changes due to erect posture and its implications.

1.7 Cultural Evolution (Broad outlines of pre-historic cultures):-

(a) Paleolithic
(b) Mesolithic
(c) Neolithic
(d) Chalcolithic
(e) Copper-Bronze age
(f) Iron age

2.1 Family - Definition and typology of family, household and domestic groups. Basic structure and functions; stability and changes in family. Typology and processual approaches to the study of family, Impact of urbanization, industrialization, education and feminist movements. University of family- a critique.

2.2 Concept of Kinship: Definition of kin, incest prohibition exogamy and endogamy. Principles of descent- types and functions. Political and rural aspects of kinship. Unilineal, bilateral and double descent. Descent, filiation and complementary filiation. Kinship terminology Alliance and descent.

2.3 Marriage- Definitions, types and variation of marriage systems. Debates on the universal definition of marriage. Regulation of marriage-preferential, proscriptive and open system. Types and form of marriage dowry, bride-price, gestation, marriage stability.

3.1 Study of culture, patterns and processes. Concept of culture, patterns of culture, relationships between culture and civilization, culture and society.

3.2 Concepts of Social Change and Cultural Change.

3.3 Social structure and social organization, Role-analysis and social network. Instructions, group's community. Social stratifications:

Principles and form, status, class and power, gender. Nature and types.

3.4 Concept of Society.

3.5 Approaches to the study of culture and society-classical evolutionism, neo-evolutionism, cultural ecology, historical particularism and diffusionism, Structural-functionalism, culture and personality, transactions-alism, symbolism, cognitive approach and new ethnography, post structuralism and post modernism.

4.1 Definitions and functions of religion, Anthropological approaches to the study of religionevolutionary, psychological and functional. Practice of magic, Witchcraft and sorcery; Definitions and functions and functionaries like priest, shaman, medicine man and sorcerers. Symbolism in religion and rituals. Ethno medicines, its definition, historical background, present status and significance in modern times. Myths and rituals: definitions and approaches to their study-structural, functional and processual relation with economic and political structures.

5.1 Meaning, scope and relevance, principles governing productions, distribution and consumption in communities subsisting on hunting-gathering, fishing, pastoralism, horticulture and other economic pursuits. Formalist and substantivist debate-Dalton, Karlpoyanny and Marx approach and new economic anthropology. Exchange: gifts, barter, trade, ceremonial exchange and market economy.

5.2 Theoretical foundations. Types of political organizations-band, tribe, control, law and justice in tribal and peasant societies including Indian scenario.

6.1 Concepts of developmental anthropological perspective. Models of development. Critiques of classical developmental theories. Concepts of planning and planned development. Concepts of participatory development. Culture ecology and sustainable development. Displacement and rehabilitation.

7.1 Concept of research in anthropology, subjectivity and reflexivity in terms of gender class, ideology and ethics. Distinction between methodology, methods and techniques. Nature and explanation in anthropological research. Positivistic and non-positivistic approaches. Comparative methods; nature, purpose and methods of comparison in social and cultural anthropology. Basic techniques of data collection. Interview, participant and other forms of observation, schedules, questionnaire, case study methods, extended case study methods, life histories and secondary sources, oral history, genealogical method, participatory, learning and assessment (PLA). Participatory rapid assessment (PRA). Analysis, interpretation and presentation of data.

8.1 Concept, scope and major branches of human genetics. Its relationship with their branches of science and medicine.

8.2 Method for study of genetic principles in man-family study (Pedigree analysis, twin study, foster child, co-twin method, cytogenetic method, chromosomal and karyo-type analysis), biochemical methods, immunological methods, DNA technology and recombinant technologies.

8.3 Twin study method-zygosity, heritability estimates, present status of the twin study method and its applications.

8.4 Mendelian genetics in man- family study, single factor, multifactor, lethal, sub-lethal, and polygenic inheritance in man.

8.5 Concept of genetic polymorphism and selection, Mendelian population, Hardy-Weinberg law; causes and changes which bring down frequency-mutation, isolation, migration, selection, inbreeding and genetic drift. Consanguineous and cousin marriages (statistical and probability methods for study of human genetics).

8.6 Chromosomes and chromosomal aberrations in man, methodology.

(a) Numerical and structural aberrations (disorders).

(b) Sex chromosomal aberrations Klinefelter (XXY), Turner (XO), Super female (XXX), intersex, and other syndromic disorders.
(c) Autosomal aberrations-Down syndrome, Patau, Edward and Cri-du-chat syndromes.
(d) Genetic imprints in him and disease, genetic screening, genetic counselling, human DNA profiling, gene mapping and genome study.

8.7 Concept of race in historical and biological perspective. Race and racism, biological basis of morphological variation on on-merit and metric characters Racial criteria, racial traits in relation to heredity and race-crossing in man.

8.8 Ethnic groups of mankind-characteristics and distributions in world, racial classification of human groups. Principal living, people or the world, their distribution and characteristics.

8.9 Age, sex and population variation in genetic market. ABO, Rh blood groups, HLA, Hp, transferring, Gm, blood enzymes. Physiological characteristics- Hb level, body fat, pulse fate, respiratory functions and sensory perceptions in different cultural and socioeconomic groups. Impact of smoking, air pollution, alcoholism, drugs and occupational hazards on human health.

9.1 Concept and Methods of Ecological Anthropology: Resources-biological and sustainable development.

10.1 Relevance in understanding of contemporary society. Dynamics of ethnicity at rural, tribal, urban and international levels. Ethnic conflicts and political developments. Concept of nation state.

11.1 Concept of human growth and development-stages of growth-prenatal, natal, infant, childhood, childhood, adolescence, maturity, senescence.

12.1 Demography and Population study: Human Population trends in the last 100 years, 2000 years and 50 years hence; related consequences and challenges in developed, under developed and developing countries of the world.

12.2 Demographic theories-biological, registration system, sample methods, duel reporting system.

12.3 Methods of studying population growth.

12.4 Biological consequences of population control and family welfare.

12.5 Anthropology in designing of deference and other equipments.

12.6 Forensic Anthropology.

12.7 Methods and principles of personal identification and reconstruction.

PAPER-II

Evolution of the Indian Culture and Civilization-Pre historic (Paleolithic, Mesolithic and Neolithic), Protohistoric (Indus Civilization). Vedic and post-Vedic beginning. Contributions of the tribal cultures.

1. Demographic profile of India-Ethic and Linguistic elements in the Indian population and their distribution. Indian population growth patterns factors influencing its structure and growth.

2. The basis structure and nature of traditional Indian social system-a critique. Varnasharm. Purushartha, Karma, Rina and Rebirth. Theories on the origin of caste system, Jajmani system. Structural basis of inequality in traditional Indian society. Impact of Buddhism, Jainism, Islam and Christianity on Indian Society.

3. Emergence, growth and development of anthropology in India-contributions of the 19th Century and early 20th Century scholar administrator. Contributions of Indian anthropologist of tribal and caste studies. Contemporary nature of anthropological studies in India.

4. Approaches to the study of Indian society and culture-traditional and contemporary.

4.1 Aspects of Indian village: Historical perspective of Indian villages; Role of rural agriculture economy in rural life, its drawbacks and potentials, future of rural agroeconomy past, present and prospective future status and role of Indian villages in our national life.

4.2 Linguistic and religious minorities-social, political and economic status. Distribution of linguistic societies in each State in India, treats to linguistic in India and elsewhere, censes for hiding linguistic identities in modern world, role of linguistics in Human society in past, present and future.

5. Tribal situation in India- biogenetic variability, linguistic and socio-economic characteristics of the tribal populations and their distribution. Problems of the tribal Communities-land alienation, poverty indebtedness, low literacy, poor educational facilities, unemployment, underemployment, health and nutrition. Developmental projects-tribal displacement and problems of rehabilitation:

Development of forest policy and tribal, Impact of urbanization and industrialization on tribal and rural populations.

6. Problems of exploitation and deprivation of Scheduled Caste / Scheduled Tribes and Other Backward classes. Constitutional safeguards for Schedule Tribes and Scheduled Caste and Scheduled Castes. Social change and contemporary tribal societies: Impact of modern democratic institutions, development programmes and welfare measures on tribals and weaker sections. Emergence of ethnicity, tribal movements and quest for identity. Pseudotribalism.

7. Social change among the tribes during colonial and post-Independent India.

7.1 Impact of Hinduism, Christianity, Islam and other religious on tribal societies in India (Before 1947, After 1947).

7.2 Tribe and nation state- a comparative study of tribal communities in India and other countries.

8. History of administration of tribal areas, tribal policies, plans, programmes of tribal development and their implementation. Role of N.G.Os.

8.1 Role of anthropology in tribal and rural development in India.

8.2 Contribution of anthropology to the understanding of regionalism, communalism ethnic and political movements.

BOTANY
PAPER-I

(I) Biology and diversity of lower plants or Cryptogams [(Algae, Fungi, Lichens, Bryophytes and Pteridophytes], Microbes/Microbiology, Plant Pathology and Palaeobotany: Algae and Fungi: Classification, Distribution in West Himalayas and India, Economic importance, Structure and Reproduction of algae and fungi. Life histories of Nostoc, Chlamydomonas, Volvox, Oedogonium, Spirogyra, Chara, Vaucheria, Dictyota, Batrachospermum, Synchytrium, Pythium, Phytophthora, Albugo, Rhizopus, Saccharomyces, Aspergillus, Penicillum, Morchella, Ustilago, Puccinia, Agaricus and Alternaria. Comparison between algae and fungi. Lichens: General account of lichens and their economic importance. Microbes/Microbiology: Structure, Classification, Reproduction, Physiology and Mode of infection of Viruses and Bacteria. Role of microbes in agriculture, industry, medicine and pollution control. Plant Pathology: Symptoms, mode of infection and control of important fungal, bacterial and viral diseases with special reference to diseases common in Himachal Pradesh. Molecular basis of infection and disease resistance. Physiology of parasitism and control measures. Fungal toxins. Bryophytes and Pteridophytes: Classification, Distribution in West Himalayas and India, Economic importance, Structure and Reproduction of bryophytes and pteridophytes. Evolution of gametophyte and sporophyte in Bryophytes. Evolution of stelar system, Apogamy, Apospory, Heterospory and Seed habit in Pteridophytes. Life histories of Riccia, Marchantia, Pellia, Porella, Anthoceros, Sphagnum, Funaria, Polytrichum, Psilotum, Selaginella, Equisetum, Adiantum and Marsilea. Comparison among Archegoniatae. Palaeobotany: Introduction to palaeobotany, some basic principles and techniques. Short account of fossil algae, Naiadita, Rhynia, Asteroxylon, Lyginopteris and Pentoxylon.

(II) Biology and diversity of Phanerogams or Spermatophytes (Gymnosperms and Angiosperms): Comparison among Tracheophytes. Distribution of Gymnosperms and Angiosperms in West Himalayas and India. Life histories of Cycas, Pinus and Gnetum. Morphology and Anatomy: Tissues and Tissue systems. Meristems. Morphology and anatomy of root, stem and leaf. Structure of Vascular Cambium and its role in wood and bark formation. Normal and anomalous secondary growth (Dracaena, Tinospora, Boerrhavia and Nyctanthes). Structure of wood and bark. Embryology: Structure of anther and ovule. Development of male and female gametophytes. Pollination. Fertilization and Development of Seed. Development and function of Endosperm. Patterns of Embryo development. Polyembryony. Apomixis. Applications of Palynology in angiosperms. Taxonomy: Principles of nomenclature, classification and identification. Modern Trends in Taxonomy. Classification of Gymnosperms. Comparative account of various systems of Angiosperm classification. Salient features of the following families Cycadaceae, Pinaceae, Ginkgoaceae, Ephedraceae, Gnetaceae, Ranunculaceae, Brassicaceae (Cruciferae), Rosaceae, Fabaceae (Leguminosae), Euphorbiaceae, Rutaceae, Malvaceae, Apiaceae (Umbelliferae), Asclepiadaceae, Solanaceae, Lamiaceae (Labiatae), Cucurbitaceae, Asteraceae (Compositae), Liliaceae, Orchidaceae and Poaceae (Graminae).

(III) Plant Resources Utilization, Economic and Ethno Botany, Plant Breeding and Biostatistics: Plants as sources of Food, Fibers, Wood/Timber, Drugs, Oils, Latex/Rubber, Paper, Starch, Beverages, Spices and Condiments, Gums and Resins, Tannins and Dyes, Insecticides. Ornamental plants. Biomass as a source of energy. Energy plantations. Importance of Ethno-botany in Indian context. Underexploited/Underutilized Plants [Winged or Goa Bean (Psophocarpus tetragonolobus); Jojoba or Hohoba (Simmondisa chinensis), Guayule or Wuyule (Parthenium argentatum), Leucaena or Subabul (Leucaena leucocephala) and Triticale (Triticosecale)]. A general account of Edible Wild Plants. Origin of cultivated

plants. Centers of origin. Methods and Modes of reproduction in relation to breeding self pollinated, cross pollinated, vegetatively propagated and apomictic plants. Introduction, Selection and Hybridization (pedigree, backcross, mass selection, bulk method). Male sterility and heterosis breeding. A general account of Inbreeding depression and Heterosis; Exploitation of Hybrid Vigour; Production of Hybrids, Composites and Synthetics. Uses of genetic engineering, polyploidy, mutations and apomixes in plant breeding and crop improvement. Role of cell and tissue culture in propagation and enrichment of genetic diversity. Plant breeding techniques in wheat, rice, sugarcane and cotton only. Biostatistics: Mean, Median, Standard deviation and Coefficient of variation.

PAPER-II

(I) Environmental Biology (Plant Ecology, Plant geography, Principles of Biodiversity and Conservation): Scope of Ecology. Biotic and abiotic components. Plant Communities. Plant Succession. Ecological adaptations. Biogeochemical cycles. Vegetation and Forest Types of India with particular reference to Himachal Pradesh. Deforestation, Aforestation and Social forestry. Soil erosion, wastelands and reclamation. Environmental pollution and its control including phytoremediation. Bioindicators. Global warming. Concepts of Biosphere, Ecosystems, Biodiversity, in situ and ex situ Conservation, Endemism and Hot spots. Plant genetic resources and their importance. Factors contributing to the loss of forest biodiversity. IUCN categories of Threat and Red Data Books. Role of Botanical gardens and Herbaria. Convention on Biological Diversity (CBD). Sovereign rights and Intellectual Property Rights.

(II) Plant Physiology and Biochemistry**:** Absorption and Conduction of Water. Mineral Absorption. Role of elements and mineral deficiencies. Transpiration. Mechanisms of stomatal movements. Respiration. Photorespiration. Photosynthesis. Anatomy of C3 and C4 plants. Nitrogen fixation. Nitrogen metabolism. Enzymes and coenzymes. Plant Growth and Movements. Photoperiodism and Vernalization. Plant Hormones. Dormancy and germination of seeds. Photomorphogenesis. Stress physiology with respect to temperature, water and salinity stress. Physiology of flowering. Fruit ripening. Chemical foundations of biology: Physico-chemical properties of water, pH, acids, bases, buffers, types of bonds and their importance, free energy, resonance and isomerisation. Structure and functions of Carbohydrates, Lipids/Fats, Amino acids, Peptides, Proteins and Nucleic acids.

(III) Cell Biology, Genetics, Evolution, Molecular Biology and Biotechnology**:** Techniques of cell biology, Prokaryotic and eukaryotic cells. Cell theory. Cell as a unit of structure and function, ultra-structure of cell and its various organelles (chloroplasts, mitochondria, endoplasmic, reticulum, ribosomes, endosomes, vacuoles, lysosomes, peroxysomes). Extracellular matrix or ECM. Cell wall and plasma membrane. Nucleus, Nucleolus, Nuclear pore complex (NPC), Chromatin and Nucleosome. Nucleic acids − their structure, reproduction and role in protein biosynthesis. DNA polymorphism. The physical and chemical structure of chromosomes. Mitosis and Meiosis. Molecular control involving check points in cell division cycle. Structural and Numerical changes in chromosomes. Structure, behaviour and significance of polytene, lampbrush and B-chromosomes. Pre and Post Mendelian concept of Genetics. Laws of inheritance. Chromosome theory of inheritance. Gene and Allele concepts. Linkage, Crossing over and Gene mapping. Genetic Code. Regulation of gene expression. Sex chromosomes and sex-linked inheritance. Sex determination. Biochemical and molecular basis of Mutations. Extra chromosomal / Cytoplasmic inheritance. Evidences, Mechanisms and Theories of organic evolution. Micropropagation. Cell, tissue, organ and protoplast culture. Genetic engineering. Methods of gene transfer and transgenic crops. Development and use of molecular markers. Fermentation technology. Biofertilizers.

CHEMISTRY
PAPER-I

1. Quantum mechanics.—Plank's hypothesis of quantization of energy. Implications of Plank' hypothesis for black -body radiation, heat capacities of solids, photoelectric effect. wave - particle duality and Heisenberg uncertainty principle. The wave function, information in a wave function, normalization of wave function. Eign values and eign functions. Operators, postulates of quantum mechanics (principals and introduction). Schrodinger wave equation for free particle and particle in one dimension and three dimension box. Schrodinger wave equation for hydrogen atom, radial and probability wave function.

2. Chemical bonding.—Ionic bond, characteristics of ionic compounds, factors affecting stability of ionic compounds, lattice energy, Born-Haber cycle; covalent bond and its general characteristics, polarities of bonds in molecules and their dipole moments Valence bond theory, concept of resonance and resonance energy. Molecular orbital theory, (LCAO method); bonding in homonuclear molecules: H2+, H2 to Ne2, NO, CO, HF, CN, BeH2 and CO2. Comparison of valence bond and molecular orbital theories, bond order, bond strength and bond length.

3. Molecular spectroscopy.—Rotational spectrum of rigid diatomic molecule, vibrational spectrum of simple harmonic oscillator, effect of isotopic substitution. Raman spectroscopy, stokes' and anti - stokes' Raman lines, and Raman shifts. Introduction and principle of resonance spectroscopy (nuclear magnetic, electron spin resonance techniques).

4. States of matter.—Gaseous State: Maxwell's law of velocity distribution among gas molecules. Equi partition of energy. Equations of state for ideal and real gases. Vander Walls and Virial equations of state, critical phenomena, principle of corresponding state, equation of reduced state. Liquefaction of gases, collision between gas molecules and mean free path. *Solid State*: Types of solids, law of constancy of interfacial angles. Crystal and their classification. Crystal lattice and unit cells. Imperfection in crystals. Laws of rational indices. Bragg's law of X-ray diffraction by crystals. Properties of solids: electrical, magnetic and thermal (only qualitative interpretation).

5. Thermodynamics and statistical thermodynamics.—First law of thermodynamics: Thermodynamic systems, states and processes, work heat and internal energy. Different types of work done on a system in reversible and irreversible processes. Calorimetry and thermochemistry. Enthalpy dependence on temperature in physical and chemical processes. Joule - Thomson effect and inversion temperature. Heat capacities of gases. Second law of thermodynamics and its applications: Spontaneity of a process, entropy and entropy changes in various processes. Free energy functions and their significance. Relation between equilibrium constant and thermodynamic properties. Statistical Thermodynamics: Configuration and weights. Canonical and grand canonical ensemble The molecular partition function. Thermodynamic information in partition function.

6. Phase equilibria and solutions.—Equilibrium between liquids solids and vapours of a pure substance. Clausius-Clapeyron equation and its applications. Phase rule and its applications for simple one component (water and sulfur) and two components (lead - silver, salt hydrates) systems. Raoult's and Henry's laws, fractional steam distillation. Phase diagram for partially miscible liquids. Partial molar quantities and their determination. Distribution law its modifications, limitations and applications.

7. Colligative properties, ionic equilibria and electrochemistry.—Dilute solution and colligative properties. Determination of molecular weights using colligative properties. Ions in solutions, ionic equilibria, dissociation constants of acids and bases. Hydrolysis of salts. pH and

buffers, theory of indicators. Conductivity of ionic solutions, Ostwald dilution law and Kohlrausche's law. Transport number and its determination (emf and Hittorf's methods only). Faraday's law of electrolysis and its applications, Galvanic cells measurements of their emf, cell reactions, standard cells and standard reduction potential. Nernst equation (relation between thermodynamic quantities cell emf) Fuel cells. Electrochemistry of corrosion and its protection. Introduction and principle of electro analytical techniques: voltametry, polarography, amperometry and cyclic – voltametryans ion – selective electrodes and their use.

8. Chemical kinetics.—Rates of chemical reactions and their dependence on the concentration of the reactants. Differential and integral rate equations for first and second order reactions. Half – life periods. Temperature dependence of rate constant and Arrhenius parameters. Elementary ideas regarding collision and transition - state theory. Elementary idea of fast reactions and introduction and principle of the techniques (stop - flow, temperature jump and field jump only) employed to study the fast reactions.

9. Photochemistry.—Laws of photochemistry, quantum yield, excited singlet and triplet states. Photophysical pathways of decay of excited states, Javlonsky diagram. Fluorescence, phosphorescence and delayed fluorescence. photochemical reactions between hydrogen and halogens and of cobalt(III) and chromium (III) complexes.

10. Colloids, surface phenomenon and catalysis.—The colloidal state, preparation and purification of colloids and their characteristic properties. Coagulation, and protection of colloids. Gels, emulsion, microemulsion, surfactants and elementary idea of micellization of surfactants. Adsorption from gases and solutions on solids. Adsorption - isotherms, BET isotherms. Determination of surface area. Characteristics of homogeneous and heterogeneous catalysis. Central dogma of enzyme catalyzed reactions.

11. Bio-Inorganic chemistry.—Essential and trace elements in biological processes, metal ions in biological systems and their role in ion-transport across the membranes (molecular mechanism), photosynthesis-PSI, PSH, metalloporphyrines with special reference to haemoglobin and myoglobin, nitrogen fixation, cyanide poisoning.

12. Coordination chemistry.—a. Introduction to theories of bonding in transition metal complexes. Valence bonds theory, crystal field theory and its modifications; application of theories in the explanation of magnetism and electronic spectra of metal complexes.

b. Isomerism in coordination compounds. IUPAC nomenclature of coordination compounds; stereochemistry of complexes with 4 and 6 coordination numbers; chalet effect and polynuclear complexes; trans effect and its theories; kinetics of substitution reactions in square-planar complexes; thermodynamic and kinetic stability of complexes.

c. Synthesis and structures of metal carbonyls; carboxylate anion, carbonyl hydrides and metal nitrosyl compounds.

d. Complexes with aromatic systems: Synthesis structures and bonding in metal olefin, alkyne, allyl and cyclopentadienyl complexes. Homogeneous transition metal catalysis: Reasons for selecting transition metals in catalysis, coordinative unsaturation, oxidative addition and reductive elimination reactions, Proximity insertion reactions, Hydrogenation and hydroformylation reactions of alkenes, fluxional molecules and their characterization.

13. General chemistry of 'f' block elements.—Lanthanides and actinides; separation, oxidation states, magnetic and spectral properties; lanthanide contraction.

14. Non-Aqueous Solvents.—Reactions in liquid NH3, HF, SO2 and H2SO4 Failure of solvent system concept, coordination model of non-aqueous solvents. Some highly acidic media, fluoro sulphuric acid and super acids.

PAPER-II

1. Delocalized covalent bonding.—Conjugation, Cross conjugation, Hyperconjugation, Bonding in fullerenes, Tautomerism, Aromaticity in benzenoid and non-bezenoid compounds, Anti-aromaticity, Homoaromaticity, PMO approach; Bonds weaker than covalent, Crown ethers complexes, Cryptands, Inclusion compounds, Cyclodextrins, Catanenes and Rotaxenes.

2. Reaction mechanisms**.—**(a) Kinetic and thermodynamic requirements and control of organic reactions, potential energy diagrams, Hammet equation and linear free energy relationship, Taft equation, Methods (both kinetic and non-kinetic) of study of mechanism of organic reactions illustrated by examples–use of isotopes, cross-over experiment, intermediate trapping and stereochemistry.

(b) Reactive intermediates: Generation, geometry, stability and reactions of carbonium ions, carbanions, free radicals, carbenes, benzynes and nitrenes.

(c) Catalysis in Organic Chemistry: Mechanisms and applications of enzymatic catalysis, micellar catalysis and phase transfer catalysis.

(d) Substitution reactions: SN1, SN2, SNi, and SET mechanisms, Neighbouring group participation and anchimeric resistance, Classical and non-classical carbonium ions, Nucleophilic reactions at an allylic and vinyl carbon, Structure and reactivity relationship in substitution reactions, Ambident nucleophile, and Regioselectivity.

(e) Elimination reactions: E1, E2, E2C and E1CB mechanisms, Spectrum of mechanisms, Effect of substrate structure on reactivity, Orientation in E2 reactions–Saytzeff and Hoffmann; Mechanism and examples of syn elimination, Mechanism of pyrolytic elimination in vapour phase, Structure and reactivity relationship in elimination reactions.

(f) Addition reactions: Electrophilic and nucleophilic addition to C=C and C_C, nucleophilic addition to C=O, C=N, Conjugated olefins and carbonyls, Structure and reactivity relationship, Hydrogenation of double and triple bonds, Asymmetric synthesis, Sharpless epoxidation.

(g) Rearrangements: Pinacol-pinacolone, Demjanov ring expansion, Hoffmann, Schmidt, Lossen, Beckmann, Baeyer–Villiger, Favorskii, Fries, Claisen, Cope, Stevens, Wolf and Wagner-Meerwein rearrangements.

3. Pericyclic reactions.—Classification, Conservation of orbital symmetry, Woodward-Hoffmann rules—electrocyclic and cycloaddition reactions [2+2 and 4+2] and sigmatropic shifts [1, 3; 3, 3 and 1, 5], FMO and PMO approach.

4. Chemistry and mechanism of following reactions.—Aldol condensation (including directed aldol condensation), Claisen condensation, Dieckmann, Knoevenagel, Perkin, Witting, Clemmensen, Wolff-Kishner, Cannizzaro and Von Richter reactions; Stobbe, Benzoin and acyloin

condensations; Fischer indole and Skraup synthesis, Bischler-Napieralski, Sandmeyer, Reimer-Tiemann and Reformatsky reactions.

5. Polymers.—(a) Fundamentals of polymer science: macromolecular concept

(b) Polymerization: Mechanisms: Addition, Step Growth and Coordination polymerization, Methods: Bulk, suspension, interfacial condensation and emulsion polymerization.

(c) Properties of polymers: Glass transition temperature, crystallinity, molecular weight, Polymer solutions and their thermodynamic properties, Determination of molecular weights by sedimentation, light scattering, osmotic pressure, viscosity, end group analysis methods.

(d) Commercial polymers: Poly (methyl methacrylate), Polycarbonate, Teflon, silicones, fire retardant polymers.

(e) New concepts in polymers: Biomaterials, Polymer catalysts, reagents and substrates, and Conducting polymers.

6. Synthetic uses of reagents.—OsO4, HIO4, Pb(OAc)4, Hg(OAc)2, SeO2, B2H6, Na-Liquid NH3, LiAlH4, NaBH4, n-BuLi and NBS.

7. Photochemistry.—General concepts of photochemistry: Jablonski diagram; Norrish-Type I and Type II reactions; Paterno-Buchi Reaction, Barton reactions, Photo Fries rearrangement.

8. Principles of spectroscopy and applications in structure elucidation.—(a) UV-visible spectra: electronic excitation; simple chromophoric groups, application to conjugated and extended conjugated systems, solvent effects, stereochemistry, Woodward-Fisher rules, application of UV-visible spectroscopy.

(b) Infra red spectroscopy: Molecular vibration, Absorption of common functional groups, Applications of IR.

(c) Nuclear magnetic resonance: Theory of nuclear magnetic resonance, Relaxation phenomenon, Chemical shift; Shielding mechanism, Spin-spin splitting, Chemical exchange, Double resonance, Applications of 1H NMR.

(d) Mass spectrometry: Principle of mass spectrometry, Different modes of ionization, Metastable peak, Factors affecting fragmentation of simple organic molecules, McLafferty rearrangement, Nitrogen rule.

9. Modern Concept in Chemistry.—Basic concepts of Green chemistry, Supramolecular chemistry, Combinatorial chemistry.

CIVIL ENGINEERING
PAPER-I

Theory and design of structures.—Strength of Materials - Simple Stress and Strain, Elastic constants, Principle stresses & strains in two dimensions, Theories of failures, Mohr circle, axially loaded compression members, Shear force and bending moment, theory of simple bending, Shear Stress distribution across cross sections, Beams of uniform strength.

Structural Analysis- Principle of superposition, reciprocal theorem, unsymmetrical bending, columns and struts, Analysis of determinate and indeterminate structures, simple and space frames, degrees of freedom, virtual work, energy theorems, deflection of trusses, redundant frames, three moments equation, slope & deflection method, moment distribution method, column analogy & energy methods, Matrix method of analysis, stiffness and flexibility matrix & Elements of plastic analysis. Analysis of determinate and indeterminate arches, spandrel braced arches. Moving loads - influence lines for simple and continuous beams and frames.

Steel Design - Factors of safety and load factor, Welding, riveting & bolting, design of tension, compression and flexural members, built up beams and plate girders, semi-rigid and rigid connections, Design of stanchions, slab and gusted bases, crane and gantry girders, roof trusses, water tanks. Plastic design of continuous frames and portals.

R.C.C. Design – Working stress method – Design of beams, slabs, columns & staircases. Limit state method - Design of one way and two way rectangular slabs, simple and continuous beams, columns, stairs. footings- single and combined raft foundations, elevated water tanks, encased beams and columns, Design of retaining, counter fort & breast walls.

Methods and system of prestressing, anchorages losses in prestress, design of prestressed girders and beams.

Building Construction.—Building materials and construction- timber, stone, brick, sand, surkhi, mortar, concrete, paints and varnishes, plastics. Detailing of walls, floors, roofs and ceilings, staircases, doors and windows, plastering, jointing, painting, use of building codes, ventilation, air conditioning, lighting and acoustics. Building estimates and specification, construction scheduling- PERT and CPM

Soil Mechanics and Foundation Engineering.—Soil Mechanics- classification of soil, atterberg's limits, void ratio, moisture contents, permeability, laboratory and field tests, seepage and flownets, flow under hydraulic structures, uplift and quick sand condition, unconfined and direct shear tests, triaxial test, earth pressure theories, stability of slopes, theories of consolidation, rate of settlement, total and effective stress analysis, pressure distribution in soils, Boussinasque and Westergaard's theories, soil stabilization. Foundation Engineering- Bearing capacity of footings, piles and wells, design of retaining walls, sheet pile and caissons.

PAPER-II

Survey and Transportation Engineering:

Survey.—Common methods of distance and angle measurements, plane table survey, levelling, traverse survey, triangulation survey, corrections and adjustments, contouring, topographical map, surveying instruments, Tachometry, Circular & transition curves, Principles of Photogrammetry, Principles of Remote sensing and GIS.

Highways- classification of roads, planning, geometric design of highways, highway materials, flexible and rigid pavements, Traffic engineering and traffic surveys, intersection and road signs, signals and markings, Road drainage- culverts & small bridges, transportation system design.

Railways- permanent way, ballast, sleeper, chairs and fastening, points and crossing, different types of turnouts, cross-overs, setting out of points, maintenance of track, super elevation, creep of rail, ruling gradients, track resistance, tractive effort, curve resistance, station yards, signals and interlocking, Railway crossing.

Fluid Mechanics and Hydraulic Engineering.—Dynamics of fluid flow - equations of continuity energy and momentum, Bernoulli's theorem, velocity potential and stream function, rotational and irrotational flow, free and forced vortices, flow net. Dimensional analysis and its application to the practical problems, viscous flow between static and moving parallel plates, flow through circular tubes, velocity distribution in laminar and turbulent flow, critical velocity, losses, hydraulic and energy grade lines, siphons, pipe network, Forces on pipe bends, compressible flow, subsonic and supersonic velocity, Mach number, shock waves water hammer.

Open channel flow - Energy & momentum factors, uniform & non-uniform flows, specific energy & specific force, critical depth, gradually varied flow, classification of surface profiles, Hydraulic jump.

Design of canals- Unlined channels in alluvium, the critical tractive stress, principles of sediment transport, regime theory, lined channels, Canal lining, Canal structures- design of regulation work, cross drainage work cross regulators, head regulators, canal falls, aqueducts, canal outlets, Diversion Headwork-principle of design of different parts on impermeable and permeable foundations, Khosla's theory, energy dissipation. Dams- Design of rigid dams, earth dams, forces acting on dams, stability analysis, design of spillways.

Hydrology- hydrological cycle, precipitation, evaporation, transpiration and infiltration, hydrographs- unit hydrograph, flood estimation and frequency analysis, Reservoir planning & storage capacity, Water requirements for crops - quality of irrigation water, consumptive use of water, water depth and frequency of irrigation, duty of water, irrigation methods and efficiencies. water logging - its cause and control, design of drainage system, soil salinity. River training works.

Water Supply & Sanitation.—Water supply- Ground water hydraulics, demand of water, impurities of water- physical, chemical and bacteriologic analysis, water borne diseases, intake of water pumping and gravity schemes. Water treatments- principle of settling, coagulation, flocculation and sedimentation, slow, rapid and pressure filters, softening, removal of taste, odour and salinity. Water distribution- layouts storage, hydraulic pipelines, pipe fittings, pumping stations and their operations.

Sanitation- sanitary appliances, latrines and urinals, Disposal of sanitary sewage, industrial waste, storm sewage, separate and combined system. Flow through sewers, design of sewers, sewer appurtenances- Manholes, inlets, junction, siphons, ejection etc. Sewer treatment working principles, units- chambers, sedimentation tank etc. activated sludge process, septic tank and disposal of sludge, rural sanitation, environment pollution and ecology.

COMMERCE AND ACCOUNTANCY
PAPER-I
ACCOUNTING, TAXATION & BUSINESS FINANCE
ACCOUNTING AND AUDITING

Meaning and Scope of Accounting.—Need, Development, Book keeping and Accounting, Users of Accounting, Branches of Accounting, Objectives of Accounting.

Accounting Principles.—Concepts and Conventions

Accounting Transactions.—Accounting cycles, Double Entry System, Journals, Ledgers, Trial Balance

Classification of Income and Expenditure.—Subsidiary Books, imprest system of cash, Bank Reconciliation Statements.

Final Accounts.—Manufacturing Accounts, Trading Accounts, Profit and Loss Account, Balance Sheet, Rectification of errors.

Depreciation.—Depreciation Accounting
Self Balancing System and Sectional Balancing System
Branch Accounts
Accounts of Non- Trading Organization
Consignments Accounts
Hire purchase and Instalment System Accounting

Issue of Shares, Forfeiture, and Reissue of Shares, Redemption of Shares, Issue and Redemption of Debentures

Valuation of Goodwill and Shares
Final Accounts of Companies, Final Accounts of Insurance and Banking Companies, Accounting for Amalgamation of Companies excluding Inter- Companies Holdings.

Reconstruction Schemes
Consolidated Balance Sheet of Holding Companies with one subsidiary only
International Accounting Standards (outline only)

COST ACCOUNTING

Nature and Scope of Cost Accounting: Cost Concepts and Classification, Methods and Techniques, Installation of Costing System, Concept of Cost Audit

Accounting for Material Control: Techniques, Pricing of material, Treatment of Material losses Accounting for Labour: Control Procedures, Labour Turnover, Idle Time, Piece Rates, Incentives Schemes

Accounting for Overheads : Classification and Departmentalization, Absorption of Overheads, Determination of Overhead Rates, Under and Over Absorption of Overheads and treatment.

Cost Ascertainment**:** Unit Costing, Job and Contract Costing. Process Costing excluding interprocess profits, Operating Costing, Joint and By products.

Standard Costing and Variance Analysis
Marginal Costing and its application in Decision Making

AUDITING

Meaning and Objectives of Auditing, Types of Audit, Internal Audit.
Audit Process, Audit Programme, Audit and Books, Working Papers, Evidences, Consideration for commencing an Audit, Routine Checking and Test Checking.

Internal Check System and Internal Control, Audit Procedure, Vouching, Verification of assets and liabilities.

Audit of limited companies:

A. Audit of Companies, Company Auditor; Appointment, Powers, Duties & Liabilities.
B. Divisible Profits and Dividend
C. Auditors Report

Audit of Banking Companies, Insurance Companies, Educational Institution Investigation, Recent Trends in Auditing

TAXATION & BUSINESS FINANCE

TAXATION

Basic Concepts: Income, Agriculture Income, Casual Income, Assessment Year, Previous Year, Gross Total Income, Total Income, Tax Evasion and Avoidance.

Basis of Charge, Scope of Total Income, Residence Status and Tax Liability, Income not forming part of Total Income.

Heads of Income: Salaries, Income from House Property, Profits and Gains of Business and Profession, Capital Gain, Income from Other Sources Computation of Tax Liability: Individual, HUF and Firm.

Set Off and Carry Forward of Losses, Deduction from Gross Total Income. Tax Deduction at Source, Advance Tax Payment, Assessment Procedure, Tax Authorities Appeals, Penalties.

INDIRECT TAXES

Central Excise: Nature and Scope of Central Excise Important Terms and Definitions under the Central Excise Act, General Procedures of Central Excise, Clearance and Excisable Goods, Concession to Small Scale Industry under Central Excise Act, CENVAT

Customs: Role of Customs in International Trade, Important Terms and Definitions under the Customs Act 1962, Assessable value, Baggage, Bill of Entry, Dutiable Goods, Duty Exporter, Foreign Going Vessel, Aircraft Goods, Import Manifest, Importer Prohibited Goods, Shipping Bill of Landing, Export Manifest, Letter of Credit, Kinds of Duties; Basic, Auxiliary, Additional or Countervailing, Basics of Levy Advalorem, Specific duties, Prohibition of Export and Import of Good and Provisions regarding Notified & Specified Goods, Import of Goods, Free Import and Restricted Import; Type of Import, Import of Cargo, Import of Personal Baggage, Import of Stores.

Clearance Procedure for Home Consumption, for Warehousing, for Re-export, Clearance procedure for Import by Post Prohibited Exports, Canalized Exports, Exports against Licensing, Type of Exports of Cargo, Export of Baggage, Export of Cargo by land, sea and air routes. Central Sale Tax Act 1956 and H.P. Value Added Tax- 2005

FINANCAIL MANAGEMENT

Financial Management: Financial Goals, Profit vs. Wealth Maximization, Financial Functions-Investment, Financing, and Dividend Decisions, Financial Planning.

Capital Budgeting: Nature of Investment Decisions, Investment Evaluation Criteria Profitability Index: NPV and IRR Comparison.

Cost of Capital: Significance of Cost of Capital, Calculating Cost of Debt, Preference Share, Equity Capital, and Retained Earning, Combined (Weighted) Cost of Capital.

Management of Working Capital: Nature of Working Capital, Significance of Working Capital, Operating Cycle and Factors determining of Working Capital Requirements, Management of Working Capital ,Cash, Receivables, and Inventories.

PAPER-II
BUSINESS ORGANISATION, BUSINESS LAWS & BUSINESS ENVIRONMENT

BUSINESS ORGANISATION

Concepts of Business, Commerce and Industry
Business System
Business Environment: Macro and Micro environment, Environment Analysis
Social Responsibility of Business

Forms of Business Organization: Sole Trader, Partnership, Companies, HUF and Co-operative Organization., Comparative utility of various Organizations.

Promotion of a Venture: Opportunity Analysis, Legal requirement for establishment of a New Unit and Documentation required.

Marketing and Advertisement
Stock Exchange
Management: Concepts, Functions and Process
Planning: Concepts and Types
Decision Making; Concepts and Process.
Management By Objectives. Corporate Planning
Organizing: Concepts, Nature, Process and Significance, Authority and Responsibility, Centralization, Departmentalization, Organization Structure, Forms and Contingency factors.
Motivation: Concepts and Theories
Leadership: Concepts and Styles.
Communication: Nature, Process and Networks
Managerial Control: Concepts and Process, Techniques of Control.

BUSINESS LAWS & BUSINESS ENVIRONMENT

The Indian Contract Act (1872): Including indemnity, Guarantee, Bailment and Pledge Sales of Goods Act 1930
Negotiable Instrument Act. 1881
The Consumer Protection Act 1986
The Payment of Bonus Act. 1965
Employees Provident Fund Act 1952 (brief only)
Corporate Personality, Kinds of Companies, Promotion and Incorporation of Companies, Memorandum of Association, Articles of Association, Prospectus, Shares, Share Capital, Members, Share Transfer and Transmission
Company Meetings and Winding up of Companies.

Company Secretary: Appointment, Functions, Rights and Duties, Qualifications Removal, Writing of Minutes of Company Meetings

Indian Business Environment: Concept, Components, and Importance
Economic Environment of Business & Economic Trends, Income, Savings, Investment, Industry, Trade, Money

Economics Policies: Monetary & Fiscal Policy, Industrial policy, Export-Import Policy, Budget,

New economic policies
Political Environment: Relationship between Govt. and Business, Legal Environment;
Introduction to Business Law MRTP, FERA, FEMA, and SEBI Act.
Social Environment: Social institutions, Groups & Systems.
International Environment: International institution, GATT, WTO, WORLD BANK, IMF etc.

ECONOMICS
PAPER-I

1. Economic choice, consumer behaviour, producer behaviour and market forms.

2. Full employment and says law, under-employment equilibrium, Keynes theory of employment and income determination, critique of Keynesian theory.

3. Functions of money, measurement of price level changes, money and real balances, monetary standards, Quantity Theory of Money. The money multiplier. Theories of determination of interest rate. Theories of inflation and methods to control inflation. Goals and instruments of monetary management in closed and open economies.

4. Role of public finance in the developing economies. Fiscal economics: an overview of allocation, distribution and stabilization functions. Market failure, public goods and externalities. Principles of taxation, theories and measures of tax incidence, burden of public debt, management of public debt. Pure theory of public expenditure. Types of budget deficit.

5. International trade: tariffs, forms of protection, the rate of exchange, balance of payments. Aid versus trade controversy. WTO regime: structure, rationale, objectives, strategies, policies and global pattern of MNC's activities. Critical assessment of the stabilization programmes of the international institutions i.e. IMF, IBRD and the World Bank. International trade and environmental issues.

6. Economics growth, development and sustainable economy. Welfare indicators and measures of growth. Human development indices, the Basic Needs Approach. Povertydevelopment and environment nexus. Structural change and economic development. Trade off between equity and growth.

7. Planning and market mechanism. Relation between state planning and growth, changing roles of market and plans in growth and economic policy. State intervention and privatization debate. Decentralized planning and peoples participation.

PAPER-II

1. Indian economy in the post independent era: pattern, trend and factors determining national and per capita income in India, absolute and relative poverty in India. Factors determining employment in India. Relation between income-poverty and employment. Poverty eradication and social welfare programmes and their performance. Impact of economic reforms on poverty and employment in the Indian economy.

2. Agriculture in India : Agriculture Policy, size of agricultural holdings and efficiency, Green Revolution and technological changes, agricultural prices and terms of trade, agricultural prices and production, land reforms, current problems and issues of Indian agriculture. WTO agreement on agriculture (AOA) and its implications for India. Relationship between agriculture and industry.

3. Industry: process, rationale, objectives strategies and policies in the Indian context. Employment implications of industrialization, Appropriate industrial technology for India. Phases of industrial growth and changes in industrial structure in India. Public sector performance in India. The concept of joint sector. Foreign collaborations and multinationals in India. Debate on disinvestment of public sector undertakings. Large versus small scale industry debate in India. Impact of New Industrial Policy on Indian industry.

4. Money and Banking: the monetary institutions of India, factors determining demand for and supply of money, techniques of money supply regulation under open economy. Functioning of money market in India. Indian capital market. Financial sector reforms and its impact.

5. Foreign trade of India: growth, pattern and direction. Import substitution versus export promotion policies. India's external borrowings: the debt problem, impact of external debt on Indian economy. Balance of payment situation in India. Integration of Indian economy with the world economy. Implications of Trade related Intellectual Property Right (TRIPS) and Trade related investment measures (TRIMS) for India. External sector reforms in the Indian economy, challenges prospects and opportunities.

6. Public Finance: Nature and extent of deficits in the central and state budgets. Policy measures to correct fiscal imbalances in India. Growth of public debt in India. Issues relating to growth and structure of public expenditure in India. Savings and inflationary finance. Federal Finance in India. Fiscal reforms and it's budgetary implications.

7. Economic planning in India: Objectives, strategy, experience and problems. Savings and investment rates, trends and problems. Growth and structure of the economy of Himachal Pradesh-Problems and Constraints.

ELECTRICAL ENGINEERING
PAPER-I

Electrical Circuit Theory and Applications: Circuit components; circuit analysis techniques: mesh and nodal analysis, graph theory, duality; network theorems and applications; transient analysis: RL, RC and RLC circuits; sinusoidal steady state analysis; resonant circuits and applications; coupled circuits; balanced three phase systems. Two port networks; poles and zeros of network functions. Elements of network synthesis. Filter theory: Passive and active filters; design and applications.

Signals and Systems: Representation of continuous time and discrete time signals and systems; LTI systems; convolution; impulse response; time domain analysis of LTI systems; difference equations. Fourier transform, Laplace transform, Z-transform, transfer function. Sampling and recovery of signals; DFT, FFT; processing of analog signals through discrete time systems.

Electromagnetic Theory: Maxwell's equations, wave propagation in bounded media, boundary conditions, reflection and refraction of plane waves. Transmission line: Distributed parameters circuits, travelling waves, impedance matching. Waveguides, resonators, planar transmission lines; strip line and micro strips. EMC and EMI.

Analog Electronics: Characteristics and equivalent circuits of diodes, BJT, JFET and MOSFET.

Diode rectifier, clipping and clamping circuits. Biasing and stability. Amplifiers: single and multistage, FET amplifiers, differential, operational, feedback and power. OP AMP circuits, sinusoidal oscillators; criteria for oscillations, single transistor and OPAMP configurations. Function generators and wave shaping circuits. Power supplies.

Digital Electronics: Boolean algebra; minimization of Boolean function; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinational circuits: arithmetic circuits, multiplexers and decoders. Sequential Circuits: Latches and flip-flops, counters and shift registers. Comparators, timers, multi vibrators. Sample and hold circuits, ADCs and DACs. Semiconductor memories. Logic implementation using programmable devices (ROM, PLA, FPGA).

Energy Conversion: Types and construction, equivalent circuit, phasor diagram, tests, regulation and efficiency; autotransformer, three phase transformation, transformer harmonics, importance of transformer neutral in three phase transformations, Scott connections, three-phase to sixphase transformation. Principles of energy conversion-d.c. generators and motors: Performance characteristics, starting arid speed control armature reaction and commutation; three-phase induction motor; performance characteristics, starting and speed control. Single-phase capacitor start & run induction motor. Synchronous generators: performance characteristics, regulation, parallel operation. Synchronous motors: starting characteristics, applications; synchronous condenser. FHP motors, permanent magnet and stepper motors, brushless d.c. motors, singlephase reluctance motors, Universal motor and hysteresis motor.

Power Electronics And Electric Drives: Semiconductor power devices: diode, Power transistor, thyristor, triac, Diac, GTO, IGBT, RCT, MCT, SITh, SIT and MOSFET, static & dynamic characteristics, and principles of operation; triggering circuits; phase control rectifiers; bridge converters; fully controlled and half controlled; principles of thyristor choppers and inverters; basic concepts of speed control of DC and AC motor drives. Application of variable speed drives.

Analog Communication: Random variables: continuous, discrete; Probability; probability functions. Statistical averages; probability models; random signals and noise; white noise, noise equivalent; bandwidth; signal transmission with noise; signal to noise ratio. Linear CW modulation: Amplitude modulation: DSB, DSB-SC and SSB. Modulators and Demodulators; phase and frequency modulation: PM and FM signals; narrowband FM; generation and detection of FM and PM. CW modulation system: Superhetrodyne receivers, AM receivers, communication receivers, FM receivers, phase locked loop, SSB receiver. Signal to noise ratio calculation for AM and FM receivers.

PAPER-II

Control Systems:

Elements of control systems; block-diagram representation; open-loop & closed-loop systems; principles and applications of feedback. LTI systems: time-domain and transform-domain analysis. Stability: Routh Hurwitz criterion, root-loci, Nyquist's criterion, Bode-plots, Design of lead- lad compensators. Proportional, PI, PID controllers. State-variable representation and analysis of control systems. Principles of discrete-control systems.

Electrical Engineering Materials.—Electrical and electronic behaviour of materials; conductivity; free-electrons and band theory; intrinsic and extrinsic semiconductor, p-n junction; solar cells, super-conductivity. Dielectric behaviour of materials; polarization phenomena; piezo-

electric phenomena. Magnetic materials; behaviour and application. Photonic materials: refractive index, absorption and emission of light, optical fibres, lasers

Microprocessors and Microcomputers.—16-bit microprocessor: architecture, CPU, module design, memory interfacing, I/O, Peripheral controllers, Multiprocessing. PC architecture: overview, Advanced microprocessors.

Measurement and Instrumentation.—Error analysis; measurement of current; voltage, power, energy, power-factor, resistance, inductance, capacitance and frequency; bridge measurements Electronic measuring instruments; multimeter, CRO, digital voltmeter, frequency counter, Q-meter, spectrum- analyser, distortionmeter.

Transducers.—thermocouple, thermistor, LVDT, strain-gauge, piezo-electric crystal. Use of transducers in measurements of non-electrical quantities. Data-acquisition systems.

IC Technology.—Overview of IC Technology. Unit-steps used in IC fabrication: photo-lithography, wet and dry etching, oxidation, diffusion, ion-implantation. CVD and LPCVD techniques for deposition of polysilicon, silicon, silicon-nitride and silicon dioxide.

Power Systems.—Analysis and Control: Steady-state performance of overhead transmission lines and cables; principles of active and reactive power transfer and distribution; per-unit quantities; bus admittance and impedance matrices; power flow; voltage control and power factor correction; economic operation; symmetrical components, analysis of symmetrical and unsymmetrical faults. Concept of system stability: swing curves and equal area criterion. Static VAR system. Generation and Measurement of High Voltage. Basic concepts of HVDC and multi-phase (sixphase) transmission; FACTS. Computer control and Automaton: Introduction to energy control centers; various states of a power system; SCADA systems and RTUs. Active power control; Speed control of generators, tie line control, frequency control. Economic dispatch. Optimal Power Flow. Power system protection: Principle of over-current, differential and distance protection. Concept of solid state relays. Circuit breakers. Computer aided protection: Introduction; line bus, generator, transformer protection; numeric relays. Introduction to restructuring and deregulation of power sector.

Non-Conventional Energy Sources and Energy Management.—Introduction to the energy problem; difficulties with conventional energy sources. Wind-Energy: Wind-energy conversion systems and their integration into electrical grid. Solar-Energy: thermal conversion: photovoltaic conversion. Wave-energy. Importance of Energy Management: Energy audit; energy economics.

Digital Communication.—Pulse code modulation (PCM), differential pulse code modulation (DPCM), Digital modulation and demodulation schemes: amplitude, phase and frequency keying schemes (ASK, PSK, FSK).

Error control coding.—error detection and correction, linear block codes. Information measure and source coding. Data networks, 7-layer architecture.

Satellite communication, Radar and TV Satellite Communication.—General overview and technical characteristics, earth station equipment, satellite link design, CNR of Satellite system. Radar: Basic principles, Pulsed systems: CW Doppler radar, FMCW radar, Phase array radars. Television Systems: Television systems and standards, Black and White and Colour-TV transmission and receiver systems.

Fibre Optic System: Multiplexing.—Time division multiplexing, Frequency Division multiplexing. Optical properties of materials: Refractive index absorption and emission of light, optical fibre, lasers and optoelectronic materials Fibre optic links.

ENGLISH LITERATURE
PAPER-I
English Literature: 1600-1900

Texts for detailed study are listed below. Candidates will also be required to show adequate knowledge of the following topics and movements:

The Renaissance, Elizabethan Drama, Metaphysical Poetry, Classicism, Romanticism, the Rise of Novel, The Victorian age.

Section A

1. William Shakespeare : The Tempest
2. John Donne. The following poems:
   The Canonization
   The Good Morrow
   The Flea
   The Ecstasy
   The Sun Rising
   Death be not proud;
3. John Milton. Paradise Lost, I, IV
4. William Wordsworth. The following poems:
   Ode on Intimation of Immortality.
   Tintern Abbey.
   The Solitary Reaper
   The World is too much with us.
   Upon Westminster Bridge.
5. Alfred Tennyson. The following poem:
   Ulysses,
   The Lotus Eaters
6. Henrik Ibsen. A Doll's House.

Section B

1. Jane Austen. Pride and Prejudice.
2. Charles Dickens. Hard Times.
3. Thomas Hardy. Tess of the d'Urbervilles.
4. Mark Twain. The Adventures of Huckleberry Finn.

PAPER-II
ENGLISH LITERATURE: The Twentieth Century

Texts for detailed study are listed below. Candidates will also be required to show adequate knowledge of the following topics and movements:

Modernism, the stream of consciousness novel, Absurd Drama, Colonialism and Post Colonialism, Indian Writing in English, Feminism, Post-Modernism.

Section A

1. William Butler Yeats. The following poems:
   - Easter 1916
   - The Second Coming
   - A Prayer for my Daughter
   - Sailing to Byzantium
   - The Tower
   - Among School Children

2. T.S. Eliot. The following poems:
   - The Love Songs of J.Alfred Prufrock
   - Journey of the Magi
   - The Hollow Men

3. Robert Frost. The following poems:
   - Stopping by Woods on a Snowy Evening
   - The Road not taken
   - After Apple Picking
   - Birches
   - Mending Wall

4. W.H.Auden. The following poems:
   - In Memory of W.B.Yeats
   - The Unknown Citizen
   - The Shield of Achilles
   - September 1, 1939

5. Samuel Beckett - Waiting for Godot

6. Arthur Miller - Death of a Salesman

Section B

1. E.M.Forster: A Passage to India.
2. James Joyce: A Portrait of the Artist as a Young Man.
3. Nathaniel Hawthornem The Scarlet Letter
4. R. K. Narayan: The Guide.

FORESTRY
PAPER-I

Forest and forestry, branches of forestry. Forest types of India and their distribution. Factors influencing vegetation. Natural and artificial regeneration of forests. Collection, storage and viability tests. Pre- sowing seed treatments. Nursery practices-selection and preparation of site. Application of fertilizers. Preparation of growing mixture and filling of containers. Aforestation– selection and preparation of site, selection of stock, time and pattern of planting. Tending operation.

Silviculture system-scope and classification. Detailed study of clear felling, shelter wood, selection, accessory and coppice systems and their modifications. Conversion. Choice of silvicultural system.

Binomial nomenclature, systems of classification. Growth habit, distribution, habitat requirements, phenology, silvicultural characters, regeneration methods and uses of Cedrus deodara, Pinus roxburghii, Pinus wallichiana, Pinus gerardiana, Picea smithina. Abies pindrow, Quercus spp. Shorea robusta, Tectona grandis, Dalbergia sissoo. Acacia catechu and Bamboo spp.

Social forestry – definition scope and objectives. Role of social forestry in meeting energy, small timber requirement of rural India, environment amelioration, water regulation and checking of erosion. Place of social forestry in the National Forest Policy. Species for social forestry plantation. Social forestry in Himachal Pradesh. Van Mahotsva and Chipko Movement.

Forest soils versus cultivated soils. Classification of forest soils, their physical, chemical and biological properties. Soil erosion-processes and factors responsible. Soil conservation methods. Watershed management and water harvesting structures. Role of forests in watershed management. Soil survey and land capability classes. Problems of forest soils and their management. Fertilizer materials and their applications in forest nurseries.

General concepts and methods of tree improvement. Role of biotechnology in tree improvement. Seed production and seed orchards. Forest ecosystems-principle components and steps. Ecological succession in forest. Impacts of management practices on forest succession. Nutrient cycling and budgeting. Herbaria-principle and its establishment. Grasslands-types in India and H.P., components of grasslands, methods to improve grasslands.

Measurement of individual trees-diameter, girth, height, bark thickness, crown width, crown length, form, volume and biomass. Measurement of forest stands (crops)-height, diameter, age and volume. Forest inventory, types of sampling. Estimation of stand growth, canopy density, yield tables and their application. Introduction to remote sensing and its application in forestry.

History of forest development in India. Forest policy of 1894, 1952 and 1988. Forest Law, its necessity. Indian Forest Act, 1927. Forest Conservation Act, 1980.

PAPER-II

Logging and ergonomics-felling, conversion, transport, safety. Forest depots, saw milling, defects in wood. Wood seasoning. Wood preservation. Important wood characteristics: Wood density and strength. Wood based industries-Composite and improved wood, Pulp and paper, rayon, furniture. Forest Products-Oleoresin, katha and cutch, charcoal, tannin, gums, dyes, fibres & flosses, lac, wild fruits and oil seeds. Distribution, cultivation and utilization of pepper, cardamom, clove, Rauwolfia, Dioscorea, isabgol, belladonna, citronella grass, lavender, geranium, Mentha, Ocimum.

General characteristics of fungi, bacteria, viruses, phytoplasma and phanerogames causing tree diseases. Important diseases viz., Ganoderma root rot of shisham and khair, Armillaria root rot, Phytophthora root rot of deodar. Heart rots. Important characters of phylum, arthoropoda and class insecta. Insect-pest and disease management methods. Insect pests and diseases in forest nurseries and their management. Problems of weeds in forest nurseries and plantations. Weed control. Forest fires - their harmful and beneficial effects. Fire control methods. Fire fighting devices and extinguishing chemicals. Modern methods of forest fire control.

Principles of forestry extension education, adoption and differences of farm technology, communication methods, techniques of motivating farmers, farm women, NGOs, etc. Role of village/rural institutions for rural development.

Demand and supply analysis. Market structures and classification. Marketing of forest products and its role in economy. Cost-benefit analysis of forestry projects. Determination of optimal rotation of forest crops.

Management of wildlife habitats–Principles, practices and tools. Protected area–Sanctuary, National Parks and Biosphere reserves. Wildlife damage control–Mitigating human–wildlife conflict. Endangered species of wildlife in Himachal Pradesh. Special projects for wildlife conservation–Project Tiger and Musk Deer Project. Wildlife (Protection) Act, 1972 including amendments. Wildlife conservation – Principles and strategies, in situ and ex situ conservation. Zoos and their role in conservation.

GEOGRAPHY
PAPER-I

PRINCIPLES OF GEOGRAPHY
SECTION A- PHYSICAL GEOGRAPHY

(i) Geomorphology: Earth movements- orogenic and eperiogenic (folding and faulting), earthquakes and volcanoes, isostasy, Wegner's theory of continental drift and plate tectonics. Rocks- origin and composition, weathering, mass wasting, concept of cycle of erosion, interruption in the cycle of erosion. Geomorphic agents and processes: Erosion, transportation and deposition- fluvial, glacial, aeolian, (arid), karst and coastal (marine) landscapes.

(ii) Climatology: Atmospheric moisture: Humidity, evaporation and condensation; hydrological cycle; types of precipitation, world patterns of rainfall. Air masses and fronts: concept, classification and properties. Atmospheric disturbance: tropical and temperate cyclones; thunderstorms and tornadoes. Climatic classification; Koppen's classification.

(iii) Oceanography: Circulation of oceanic waters: waves, tides and currents; currents of the Atlantic, Pacific and Indian oceans. Marine deposits and coral reefs; Oceans as storehouse of resources for the future.

(iv) Environmental Geography: Man-environment interrelations with concept of eco-system. Utilization of natural resources and environmental hazards. Emerging environmental issues- deforestation, global warning, conservation of bio-diversity.

SECTION B- HUMAN GEOGRAPHY

(i) Population Geography: Demographic cycle concepts of over population, under population and optimum population; population problems in developed and developing countries; Migration- causes, patterns (past and present) and consequence. Number, density, growth and distribution of population, population pressure and resource utilization. Population explosion and food security.

(ii) Economic Geography: Distribution and utilization of water, mineral and energy resources; their economic and environmental significance and conservation. Types and distribution of forests and fisheries- their economic and environmental significance and conservation. Major soil types and their distribution; problems of soil erosion and soil conservation. Mineral Resources- Iron ore and energy resources- coal and petroleum.

(iii) Rural and Urban Settlements: Definition, types and patterns of rural settlements, origin and evolution of urban settlements; functional classification of urban places; trends, patterns and problems of urbanization in the world.

PAPER-II

SECTION A- GEOGRAPHY OF INDIA

(i) Physical Settings: India: A land of diversities; unity within diversities; A detailed study of physiographic divisions of India, drainage systems of India. Soil types of India-their distribution and characteristics; vegetation types and their distribution.

(ii) Population and Agriculture: Spatial patterns of population distribution and growth; Socioeconomic implications of population explosion. Major Agricultural Crops: Rice, Wheat, Cotton and Tea. Green Revolution and its impact; Problems of Indian Agriculture.

(iii) Minerals, Power Resources and Industries: The status of their use and need for conservation. Minerals- Iron ore, Power Resources- Coal, Petroleum and Hydro-power. Spatial patterns of Iron and Steel and Cotton Textile Industries, Industrial regions of India.

(iv) Geography of Himachal Pradesh: Geomorphology, Climate, Drainage, Vegetation, Hydropower and Horticulture.

GEOLOGY
PAPER-I

Physical Geology and Geomorphology.—The solar system, meteorites. Shape, size and surface relief of earth. Origin, age and interior of the earth, radioactive dating. Volcanoes-causes and effects. Earthquakes-causes and effects, seismicity and seismic zoning of India. Isostasy, orogeny and epeirogeny. Island arcs, mid-oceanic ridges, trenches, transform faults and sea floor spreading. Continental drift, plate-tectonics and their mechanism. Basic concepts of geomorphology, weathering and mass wasting, geological agents in weathering and erosion. Action of river, wind, underground water, springs, glaciers, oceans, lakes and coral reefs.

Structural Geology.—Principles of geological mapping and map reading. Behaviour of minerals and rocks under deformation conditions, stress, strain and rupture concept. Primary and secondary structures. Unconformities- types and their recognition in the field. Folds, faults, their classification and recognition on maps and in the field. Joints and their classification.

Palaeontology.—Concept of species, branches of palaeontology, index fossils, guide fossils, Precambrian life, major extinctions in past life. Different kinds of microfossils and palynofossils. Applications of microfossils and palynofossils specifically in petroleum exploration. Morphology, geologic history and evolutionary trends in Trilobita, Brachiopoda, Echinoidea and Cephalopoda. Morphology of Gastropoda, Pelecypoda, Graptoloidea and their environmental, stratigraphic significance. Evolutionary trends in Equidae, Hominidae and Proboscidae. Gondwana flora and its significance.

Stratigraphy and Geology of India.—Stratigraphic classification: Lithostratigraphic, chronostratigraphic, geologic time, biostratigraphic and magnetostratigraphic units and their possible interrelationship. Principles of stratigraphic correlation. Stratigraphic succession,

distribution and economic importance of Precambrian and Phanerozoic rock sequences of India. Precambrian/Cambrian and Cretaceous/Tertiary boundary problems. Major volcanic events of geologic past in India. Palaeogeographic reconstruction of India during Gondwana time and Palaeogebe, Neogene periods. Physiographic and tectonic divisions of India. Origin and evolution of Himalayas.

Hydrogeology and engineering geology.—Occurrence of groundwater, hydrologic cycle, groundwater aquifers and their parameters, groundwater quality criteria for different uses. Problems and management of groundwater, groundwater recharge. Rainwater harvesting and watershed management. Engineering properties of rocks. Rocks as building and construction materials. Geological investigations for dams , tunnels, bridges and highways, land hazards due to earthquakes, landslides and their impact on engineering structures.

PAPER-II

Crystallography and mineralogy.—Elements of crystal forms and symmetry. Laws of crystallography. crystal systems and classes. Crystals twinning. Petrological microscope and accessories. Crystal optics. Physical, chemical and optical properties of common rock and ore forming minerals.

Geochemistry and Petrology.— Cosmic abundance of elements. Structure and composition of earth and distribution of elements. Types of chemical bonds, coordination number, isomorphism and polymorphism. Trace elements. Magma-composition and types. Magmatic differentiation and assimilation. Bowen reaction series. Phase rule- unicomponent and bicomponent systems. Forms, texture, structure and classification of igneous rocks. Mode of occurrence, mineralogy, structure and distribution of the following rocks in India - granite, pegmatite, rhyolite diorite, gabbro, basalt and dolerite.

Metamorphism -definition, agents and types, texture, structure, concept of facies, grades and zones. Thermal and regional metamorphism of different parent rocks. Processes of sedimentation, digenesis and lithification. Clastic and non-clastic sedimentary rocks –their classification, petrography, structure and depositional environment. Sedimentary basins of India.

Economic Geology.—Ore and ore minerals, tenor of ore and classification of ore deposits. Processes of formation of mineral deposits. The study of physical properties and uses of the following ores with reference to Indian occurrences: Iron, manganese, aluminium, copper, lead, chromium zinc, nickel, cobalt, antimony, gold, silver, platinum, uranium and thorium. Coal and petroleum deposits of India. Marine mineral resources.

Mining Geology and Environmental Geology.—Mining methods in hard rock and soft rock areas. Mining operations safety and legislation. Basic principles of environment and sustainable development in relation to geology. Natural hazards and their mitigation. Environmental impact of mining and industrial and radioactive waste disposal. Water pollution.

HINDI LITERATURE
PAPER-I
PART-A
HISTORY OF HINDI LANGUAGE

1. Evolution of Avadhi, Braj Bhasha as literary language during the Medieval period.
2. Evolution of Khari Boli Hindi as literary language during the 19th century.
3. Standardization of Hindi language with Devanagari script.

4. Major dialects of Hindi and their inter-relationship.
5. Significant grammatical features of standard Hindi.

PART- B

HISTORY OF HINDI LANGUAGE

1. Chief characteristics of the major periods of Hindi literature viz. Aadi Kaal, Bhakti Kaal, Reeti Kaal, Bhartendu Yug, Diwedi yug.

1.1 Some prominent poets - Chandvardai, Vidyapati, Kabir, Soordas, Tulsidas, Jayasi, Keshav, Meera, Bihari, Ghananand, Bhartendoo, Maithlisharana Gupta.

2. Significant features of the main literary trends and tendencies in modern Hindi viz. Chhayavad, Pragtivad, Prayogvad Nayi Kavita, Samkaaleen Kavita, Samkaaleen Kavita Ke Vividh aandolan, Nayi Kahani, Saathotri Kahani, Samkaaleen Kahani Ke Vividh aandolan.

2.1 Some prominent poets - Jai Shankar Prasad, Nirala, Ram Dhari Singh Dinkar, Agyeya, Muktibodh.

2.2 Some prominent Novelists - Prem Chand, Jainendra, Yashpal, Renu, Bhishm Sahni.

2.3 Some prominent Short - Story writers - Prem Chand, Prasad, Mohan Rakesh, Gyanranjan, Udey Prakash.

3. Rise of Novel and realism in Modern Hindi.

4. A brief history of theatre & drama in Hindi.

PAPER-II

This paper will require first hand reading of the texts prescribed and will be designed to test the candidates critical ability –

Kabir	-	'Kabir Granthavali' by Shyam Sunder Das (200 Stanzas from the beginning).
Soordas	-	'Bharamar Geet Saar' (200 Stanzas from the beginning).
Tulsidas	-	From 'Ramcharitmanas' (Ayodhiya Kaand only). From 'Kavitavali' (Uttarakhand only).
Bhartendu Harishchandra	-	'Andher Nagri' (Natak).
Prem Chand	-	'Godan' (Novel) & 'Mansarovar-Bhag-Ek' (Short Stories).
Jayshankar Prasad	-	'Chandragupta' (Natak).
Suryakant Tripathi Nirala	-	'Anamika' ('Saroj Smriti', 'Ram-Ki-Shakti Pooja' Poems only).

Sachchida Nand Hiranad Vatsyayan Agyeya - 'Shekhar ek Jeevani Two Parts' (Novel).

Gajanan Madhav Muktibodh - 'Chand Kaa Munh Tehra Hai' ('Andhere Mein' poem only).

Nagarjun - 'Yug Dhara' ('Kalidas sach sach Batlana,' 'Sindoor Tilkit Bhaal' poems only).

Sudama Pandey Dhumil - 'Sansad Se Sarak Tak' ('Patkatha' poem only).

HORTICULTURE
PAPER-I

Fruit industry in India and its potential. General principles of cultivation. Method of propagation. Physiological basis of rooting. Special plant growing structures-mist propagation, green house and glass house. Promising rootstocks for fruit crop. Plant growth regulators, retardants and inhibitors relating to flowering sex expression, fruit set, fruit development and ripening. Orchard management practices, manures and manuring, irrigation, training and pruning high density plantings. Fruit thinning and fruit drop.

Origin, history, pomological description, climate requirements and production techniques of important temperate, sub-tropical fruit crops. Important pests, diseases and physiological disorders and their management, integrated management of pests and diseases. Harvesting and harvest maturity indices. Handling and marketing problems of major fruits. Special problems of production.

Principle methods of preservation. Important fruit and vegetable products. Processing techniques and equipments. Wastes from processing factory and their impact of environment. By-products and utilization. Nutritive value of fresh and processed fruits and vegetables. Standards of fruit and vegetable products.

Economic principles in fruit and vegetable production. Use of planning and budgeting techniques. Efficiency measures of orchard management.

Extension education and its importance. Methods of evaluation of extension programmes. Socio-economic survey and status of different categories of farmers. Training programmes of extension workers. Lab to land and T&V programmes.

PAPER-II

Importance, nutritive value and classification of vegetables. Types of vegetable, gardening. Principles of vegetable cultivation including nursery management. Climate requirement and cultivation of major summer and winter vegetable crops. Off-season vegetable production. Disease and pests of vegetable crops and measures to control.

Weeds, their characteristics and association with various vegetable crops. Cultural, biological and chemical control of weeds.

Principles of plant breeding in the improvement of major vegetable crops. Methods of breeding of self, cross-pollinated and vegetatively propagated crops. Seed technology and its importance. Production, processing, testing and marketing of vegetable seeds.

Plant physiology and its significance. Growth and development factors affecting growth. Absorption and translocation of water, transpiration and water economy. Modern concepts of photosynthesis and respiration.

Processes and factors of soil formation. Mineral and organic constituents of soil and their role of maintaining soil productivity. Plant nutrient elements of soil and their availability. Nitrogenous, phosphatic and pottasic and micronutrient fertilizers and their use. Problem soils and their reclamation. Water conservation and watershed management. Water use efficiency in relation to crop production. Criteria for scheduling irrigation, ways and means of reducing runoff losses.

Importance and scope of floriculture, land-scaping. History, theory and principles of landscape plantings and lawns. Beautification of slopes, forests and wastelands. Layout of home gardens and public parks. Propagation of ornamentals. Cultural requirement of ornamental trees, shrubs, climbers, bulbs and annuals for winter and summer season. Production technology and post harvest management of cut flowers, bulbs, house plants and bedding plants.

INDIAN HISTORY
PAPER-I

1. Chalcolithic cultures: Indus civilization, patterns of settlements, economic and social organization. Recent debates on the decline of the Indus civilization.

2. Society and culture in the Vedas and Upanishads: textual and archaeological evidence.

3. Mahavira and Gautam Buddha: their teachings and popularity among contemporary Mahajanapadas.

4. The Mauryan Empire: sources and their chronology, Ashoka's policy of Dhamma. The nature of the Mauryan state. Decline of the Mauryan empire.

5. Post-Mauryan period in Indian history: polity and society. Religion and culture. Urbanization and trade. Sangam texts and Tamil society. Shilppadikaram.

6. Emergence of classical patterns during the Gupta period. Evolution of art and architecture. Development of ideas in science and mathematics. Varahamihira's Brihatsamhita.

7. Seventh century: major powers in the north and the south. Changes in political structure, economy, social structure and religion.

8. Early medieval India, AD 700-1200. Tripartite struggle in north India. The rise of the Cholas in the south. Debates on Indian feudalism. Village communities in the south. Typology of urban centres. The Arab conquest of Sind. Alberuni's India: society and science. The emergence of temple as an institution.

9. The emergence of the Ghaznavide Empire. The Ghorian invasions and their impact. Causes of the success of the Ghorian Turks. The Delhi Sultanate: Balban. Alauddin Khalji and his agrarian and economic measures.

10. Fragmentation of the Sultanate, and the rise of provincial kingdoms: Bengal, Kashmir, Gujarat, Malwa and Bahmanids. The Vijayanagar empire. Evolution of Indo-Persian literature. Bhakti and Sufi movements in the fifteenth and sixteenth centuries.

PAPER-II

1. The Mughal Empire: early expansion under Babar and Humayun. Sher Shah's administrative and revenue measures. Akbar and his India. Establishment of jagir and mansab systems. Akbar's policy towards chieftains, especially Rajputs. Akbar's religious policy. Abul

Fazl's Akbarnama. Mughal-Rajputs relations under Jahangir, Shahjahan and Aurangzeb. Debate on the nature of the Mughal state. Economy and Society. Urban centres. Trade with Europe through Dutch, English and French companies.

2. Culture during the Mughal court: literature, painting and architecture. Religious trends: Bhakti and Sufism.

3. The Eighteenth century debate. Decline of the Mughal empire. The emergence of the regional potentates in the Deccan, Bengal and Awadh. The rise of the Marathas, and the Afghans. India on the eve of the British conquest.

4. Factors behind British success against Indian regional powers: Mysore, Maratha power, and Bengal. Annexation of Panjab and Sind. The nature of residency system and 'doctrine of lapse'. Structure of the British Raj up to 1857.

5. Indian resistance to the British rule: 1857—causes, course, nature and impact. Changes in British administrative and economic policies after 1858. Socio-cultural impact of colonial rule. Christian missionary activities. Social and religious reform movements in Bengal and other areas. Railways. Commercialisation of agriculture. Growth of modern industry. Trade and commerce: 1858-1939.

6. The rise of Indian Nationalism. The evolution of modern associations. Peasant and tribal uprisings. The emergence of the Indian National Congress. Collaboration and confrontation of the Moderates and Extremists. Partition of Bengal, 1905. Swadeshi and Home Rule Movements.

7. Gandhian methods of mass mobilization: Rowlett Satyagraha, Khilafat and Noncooperation. Civil disobedience movement. The Swarajist politics. Simon Commission and Nehru Report. From Dominion status to Purna Swaraj. Second civil disobedience. States People's movement.

8. Act of 1935. Congress Ministeries, 1937-1939. The communal problem. India during the Second World War. The Cripps Mission. The Quit India Movement. Constitutional negotiations and the Transfer of Power.

9. Achievement of Freedom and Partition of India. Integration of Indian states. The democratic constitution, 1950. Planning and industrialization.

10. Towards Contemporary World: Some concepts Renaissance and its social roots. European State system. Industrial Revolution: Britain, Japan, China. The emergence of the nationalities, and the making of the Nation States. Two World Wars. United Nations Organisation.

LAW
PAPER-I

Total Marks = 150 Marks Distribution

Unit–I: Jurisprudence Marks = 40

(1) Schools of Jurisprudence
- (a) Analytical School
- (b) Historical School
- (c) Philosophical School
- (d) Sociological School

(2) Sources of Law
  (a) Custom
  (b) Precedent
  (c) Legislation

(3) Concepts of Law
  (a) Right and Duty
  (b) Legal Person
  (c) Ownership and Possession

Unit–II: Constitutional Law of India Marks = 40

(1) Fundamental Rights
(2) Fundamental Duties
(3) Writs

Unit–III: Marxist Theory of State and Law Marks = 35

(1) Class Character of Law

(2) Class Character of State

(3) Relation of Legal System and Economic System of a Society

Unit–IV: Salient Feature of Himachal Pradesh Land Revenue Act, 1954.
Marks = 35

PAPER-II

Total Marks = 150 Marks Distribution
Unit–I: Indian Contract Act 1972 Marks = 40

(1) General Principles of Law of Contract (Sections 1 to 75)

Unit–II: Law of Crimes Marks = 40

(1) General Exceptions (Sections 76 to 106)
(2) Offences against Public Tranquillity (Sections 141, 142, 146, 149 and 159)
(3) Offences against Human Body (Sections 299, 300, 301, 319, 320,322, 340, 359, 360, 361 and 362)
(4) Offences against Property (Sections 378, 383, 390,. 391, 399, 403, 405, 415, 421 and 441)
(5) Criminal Procedure Code – Chapter X-D Disputes as to Immovable Property (Sections 145, 146, 147 and 148)

Unit–III: Law of Evidence: Indian Evidence Act Marks = 35

(1) Of relevancy of facts (Sections 5 to 55)

(2) Facts which need not be proved (sections 56 to 58)

(3) Of oral evidence (sections 59 and 60)

(4) Of documentary evidence (sections 61 to 90 A)

(5) Of the exclusion of oral by documentary evidence (Sections 91 to 100)

(6) Burden of Proof (Sections 101 to 114–A)

Unit–IV: Law of Torts Marks = 35

(1) Nature and Definition
(2) General Defences
(3) Vicarious Liability of State
(4) Trespass as to the Person and Property (moveable and immovable)
(5) Abuse of Legal Procedure
(6) Negligence, Contributory Negligence and Composite Negligence
(7) Rules of Strict Liability and Absolute Liability
(8) Remedies

MANAGEMENT
PAPER-I

Organisational Behaviour and Management Concepts:- Significance of social, psychological factors for undertaking organizational behaviour Relevance of theories of motivation. Contribution of Maslow, Herzberg. Mc-Gregor, Mc-Clell and other leading authorities. Research studies in leadership, Management by objective. Small group and intergroup behaviour. Application of these concepts for understanding the managerial role, conflicts and co-operation, work norms and dynamics of organizational behaviour. Organisational change Organisational Design: Organizational structure, systems and objectives. Decision making, Communication and Control. Management, information system and role of computer in management.

Economic Environment:- National income, analysis and its use in business forecasting. Trends and structure in Indian Economy a Government Programmes and Policies. Regulatory policies, monetary, fiscal land planning. Regulatory Agencies, SEBI, FEMA, RBI and EXIM Policies.

Quantitative Methods – Classical optimization: Maxima and minima of single and several variables: optimization under constraints – Applications. Linear Programming; Problem formulation – Graphical Solution – Simplex method.

Statistical Methods: Measures of Central tendencies and variations – Application of Binomial, Poisson and Normal distributions. Time series – Regression and correlation Tests of Hypothesis – Decisions making under risk. Decision Trees, Replacement Theory Minimax, Maximin Criterion of decision making. Different criterion for selecting optimum strategies.

PAPER-II

The candidate would be required to attempt any five questions but not more than two questions from any one section.

Section-I

Marketing Management – Marketing and Economic Development. Marketing concept and its applicability to the Indian economy – Major tasks of management in the context of developing economy. Rural and Urban Marketing, their prospects and problems.

Concept of marketing mix-market Segmentation and Product differentiation strategies – consumer Motivation and behaviour consumer Behavioural Models – Product Brand distribution, public distribution system, price and promotion.

Decision – Planning and control of marketing programmes – research and Models – Sales Organizational dynamics – Marketing Information systems.

Export incentives and promotional strategies – Role of Government, trade association and individual organization – problems and prospects of export marketing.

Section-II

Technology Management: Types of manufacturing systems continuous repetitive, intermittent. Organising for Production, long range, forecast and aggregate. Production Planning. Plant Design Process Planning, Plant size and scale of operations. Location of plant, lay-out of physical facilities. Equipment replacement and maintenance. CAD and CAM. Object oriented programming, Elements of C++ language and functions, Enterprise resource planning, Modules/Functionality, System Analysis and Design, Tools for analysis and design of business systems, System control and quality assurance, E-Commerce, Network Infrastructure, Inter-organisational commerce, Electronic Data Interchange, Internet and Web page Designing, Search Engines, Hosting Web Site and Internet Security.

Role and importance of materials management, Value Analysis, Quality Control, Make of Buy decision, control-ABC Analysis. Economic order quality. Recorder point safety stock.

Section-III

Financial Management – General tools of Financial Analysis: Ration analysis, funds flow analysis, const-volume-profit analysis, cash budgeting-financial and operating leverage. Investment Decision, Financing Decisions, Working Capital Managements and Income Determination and Distribution.

Section-IV

Human Resource Management – Characteristics and significance of Human Resources. Personal Policies- Manpower, policy and planning – Recruitment and selection technique – Training and Development promotions and Transfers, Performance Appraisal – Job Evaluation. Wage and Salary Administration – Employees Morals and Motivation, Conflict Management. Management of change and Development. Industrial relations, Economy and Society in India. Worker profile and Management style in India. Labour Legislation with special reference to Industrial Disputes Act, Payment of Bonus Act, Trade Unions Act, Industrial Democracy and Workers Participation in Management, collective bargaining Conciliation and adjudication, discipline and grievances handling in Industry.

MATHEMATICS
PAPER-I
SECTION –A

Linear Algebra.—Matrices, row and column reductions, echelon forms. Eigenvalues, eigenvectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its applications, rank of a matrix. Applications of matrices to solve a system of linear homogeneous /nonhomogeneous equations.

Vector space, linear dependence and independence, Subspaces, Bases, dimensions. Finite dimensional vector spaces.

Linear transformations, the algebra of linear transformations, isomorphism, representation of transformations by Matrices, linear functionals. The double dual and the transpose of a linear transformation.

Inner product spaces. Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal complements. Orthonormal sets and orthonormal bases. Bessel's inequality for finite dimensional spaces. Gram-Schmidt orthogonalization process. Linear functionals and adjoints.

Calculus.—Real numbers, limits, continuity, differerentiability, mean-value theorems. Taylor's theorem with remainders. Indeterminate forms, maxima and minima, asymptotes Curvature, Concavity, Convexity, Points of inflexion and tracing of curves. Functions of two variables: continuity, differentiability, partial derivatives, Euler's theorem for homogeneous functions, Jacobian, maxima and minima. Lagrange's method of multipliers. Riemann's definition of definite integrals. Indefinite integrals, infinite and improper integrals, beta and gamma functions. Double and triple integrals. Areas, surface and volumes.

Analytic Geometry.—Cartesian and polar coordinates in two and three dimensions, second degree equations in two and three dimensions, reduction to canonical forms, straight lines, shortest distance between two skew lines. Plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

SECTION -B

Ordinary Differential Equations.—Formulation of differential equations, order and degree, equations of first order and first degree, integrating factor, equations of first order but not of first degree, Clairaut's equation, singular solution.

Higher order linear equations with constant coefficients, complementary function and particular integral, general solution, Euler-Cauchy equation.

Second order linear equations with variable coefficients, determination of complete solution when one solution is known, method of variation of parameters.

Solution by Power series method and its basis, solution of Bessel and Legendre's equations, properties of Bessel and Legendre functions.

Vector Analysis.—Scalar and vector fields, triple products, differentiation of vector function of a scalar variable, gradient, divergence and curl in Cartesian, cylindrical and spherical coordinates and their physical interpretations. Higher order derivatives, vector identities and vector equations.

Applications to Geometry.—curves in space, curvature and torsion. Serret-Frenet's formulae, Gauss' and Stokes' theorems, Green's identities.

Statics.—Analytical conditions of equilibrium of coplanar forces, virtual work.

Forces in three dimensions, Poinsot's central axis, Wrenches, Null lines and planes, Stable and unstable equilibrium.

Dynamics.—Simple harmonic motion, motion on rough curve, tangential & normal accelerations, motion in a resisting medium, motion when the mass varies, velocity along radial and transverse directions, central orbits.

Kepler's laws of motion, motion of a particle in three dimensions, acceleration in terms of Polar and Cartesian co-ordinate systems.

PAPER-II

(Note: Use of Scientific non-programmable calculators will be allowed in this paper for numerical analysis part.)

SECTION –A

Abstract Algebra.—Mappings, elementary properties of integers. Definition of a Group and Subgroup their examples and properties. Normal subgroups, Quotient Groups. Homomorphism, Groupautomorphisms, Cayley's theorem, permutation Groups.

Real Analysis.—The Riemann integral: Definition and existence of integral, refinement of partitions, Darboux's theorem, condition of integrability. Integrability of the sum and difference of integrable functions. The fundamental theorem of calculus, first and second mean value theorems of calculus.

Improper integrals and their convergence, comparison tests, Abel's and Dirichlet's tests.

Sequences and series.—Definition of a sequence, theorems on limits of sequences, bounded and monotonic sequences and their convergence. Cauchy's convergence criterion, algebra of sequences, main theorems, monotonic sequences, series of non-negative terms, comparison test, Cauchy's Integral test, Ratio test, Raabe's test, logarithmic test, Gauss's test, alternating series, Leibnitz's test. Absolute and conditional convergence.

Metric Spaces.—Definition and examples of metric spaces. Limits in metric spaces. Functions continuous on metric spaces. Open sets. Closed sets. Connected sets. Complete metric spaces. Compact metric spaces. Continuous functions on compact metric spaces, uniform continuity.

Complex Analysis.—Complex numbers, Geometric representation of Complex numbers. Analytic function, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula. Conformal mapping, Bilinear Transformation (Mobius transformation).

SECTION- B

Partial Differential Equations.—First order partial differential equations: Partial differential equations of the first order in two independent variables, formulation of first order partial differential equation, solution of linear first order partial differential equations (Lagrange's Method), integral surfaces passing through a given curve, surfaces orthogonal to a given system of surfaces, solution of non-linear partial differential equations of first order by Charpit's method.

Second order partial differential equations.—Origin and classification of second order partial differential equation, solution of linear partial differential equation with constant coefficients. Monge's method to solve the non-linear partial differential equation $Rr+Ss+Tt = V$.

Laplace Transforms.—Introduction, basic theory of Laplace transforms, solution of initial value problem using Laplace transforms, shifting theorems, unit step function, Dirac-delta function. Differentiation and integration of Laplace transforms. Convolution theorem.

Calculus of Variations.—Variation problems with fixed boundaries-Euler's equation for functionals containing first order derivative and one independent variable. Extremals. Functionals dependent on higher order derivatives. Functionals dependent on more than one independent variable. Variational problems in parametric form. Invariance of Euler's equation under coordinates transformation.

Variational problems with moving boundaries-functionals dependent on one and two functions.

Sufficient conditions for an Extremum-Jacobi and Legendre conditions.

Numerical Analysis and computer programming.—Numerical Methods: Solution of algebraic and transcendental equations of one variable by Bisection, Secant, Regula Falsi, Newton-Raphson Method, Roots of Polynomials.

Linear Equations: Solution of system of linear equations by Gaussian elimination method, Gauss-Seidel iterative method.

Interpolation: Lagrange and Newton interpolation, divided differences, difference schemes, interpolation formulas using differences.

Numerical Differentiation: Solution of ordinary differential equations by Euler's method, Runge-Kutta's II and IV order method.

Numerical Integration: Simpson's 1/3 rule, Simpson's 3/8 rule, Trapezodial rule, Gaussian quadrature formula.

Programming in C: Algorithms and flow-charts for solving numerical problems.

Developing simple programs in C language for problems involving techniques covered in the numerical analysis.

MECHANICAL ENGINEERING
PAPER-I

Engineering Mechanics.—Free body diagrams and equilibrium; centre of gravity and moment of inertia, trusses and frames; principal of virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations; impact.

Strength of Materials.—Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders; shear force and bending moment diagrams; bending and shear stresses; combined bending and direct stresses, slope and deflection of cantilever and simply supported beams with point loads and UDL; torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses, failure theories, unsymmetrical bending and shear centre, theories of elastic failure.

Theory of Machines.—Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of slider-crank mechanism; laws of gearing, gear trains; analysis of cams, governors, flywheels, static and dynamic balancing, design of machine elements such as bolted, riveted and welded joints, shafts, gears, Free and forced vibration of single degree of freedom systems; effect of damping.

Manufacturing and Industrial Engg.: Engg. Materials and their mechanical behaviour, common ferrous and non-ferrous materials, Structure and properties of engineering materials, fatigue and creep, heat treatment, metal casting, design of patterns, moulds and cores; solidification and cooling; riser and gating design, design considerations, plastic deformation and yield criteria; fundamentals of hot and cold working processes; forging, rolling, extrusion, drawing, metal forming processes; welding, brazing and soldering, powder technology.

Mechanics of machining, single and multi-point cutting tools, tool geometry and materials, tool life and wear; machining processes, principles of work holding, jigs and fixtures.

Design of cutting tools, Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly, unconventional machining processes, EDM, ECM, USM, LBM, EBM, non-destructive testing.

Production Planning and Control, work and time study, forecasting models, inventory control, inspection and quality control, TQM, aggregate production planning, scheduling, materials requirement planning, Linear programming, simplex and duplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

PAPER-II

Thermodynamics.—Zeroth, First and Second laws of thermodynamics; basic concepts of system, control volume, processes; Carnot cycle, behaviour of ideal and real gases, properties of pure substances, steam table and Mollier Diagram, calculation of work and heat in ideal processes; analysis of thermodynamics cycles related to energy conversion: Rankine, Otto, Diesel, Dual, Brayton cycle.

Fluid Mechanics.—Fluid properties; fluid statics, manometry, buoyancy; control-volume analysis of mass, momentum and energy; applications of linear momentum equation, forces on flat and curved beams, fluid acceleration; differential equations of continuity and momentum; rotation and vorticity, circulation, velocity potential, stream function, Bernoulli's equation and its application; dimensional analysis, viscous flow of incompressible fluids; boundary layer, flow separation; flow through pipes, major and minor losses, compressible flow, stagnation properties, area velocity relationship, , normal shock waves, flow through converging diverging nozzle.

Heat-Transfer.—Modes of heat transfer; one dimensional heat conduction, Fourier's Law, resistance concept, electrical analogy, critical thickness of insulation, fins, unsteady heat conduction, velocity and thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes, boiling and condensation heat transfer, radiative heat transfer, black and grey surfaces, emissive power, shape factors, network analysis; heat exchanger performance, LMTD and NTU methods of design of single and multiple pass heat exchangers.

Energy conversion and environment control.—Rankine, Brayton cycles with regeneration and reheat. boilers and condensers, I.C. Engines, working of two stroke and four stroke engines, combustion in SI and CI engines, knocking and detonation and their control, performance of SI and CI engines, turbo machinery, centrifugal pumps and compressors, steam turbines, velocity and pressure compounding, degree of reaction, Pelton-wheel, Francis and Kaplan turbines –impulse and reaction principles, velocity diagrams, cavitation, Refrigeration and airconditioning: Vapour compression refrigeration cycle, refrigerants, heat pumps, gas refrigeration, aircraft refrigeration, vapour absorption system, moist air properties, psychometric chart, basic psychometric processes, summer air-conditioning, alternate sources of energy, utilization of solar, wind energy, air pollution and its control.

MEDICAL SCIENCE
PAPER-I

C O N T E N T S

2. Biochemistry
3. Physiology
4. Forensic Medicine & Toxicology
5. Microbiology
6. Pathology
7. Pharmacology

ANATOMY

1. GROSS ANATOMY

I. Osteology

(a) Names of the bones of the body and their position; classification of the bones with examples; general features of the bone and normal development; microscopic anatomy of bone; general pattern of blood supply; ossification of the bones of the limbs for age determination. X-rays of bones.

(b) Process of repair of bone.

2. Muscular System

(a) Classification and identification of the muscles of the body: main attachments, nerve supply and action(s), microscopic anatomy of muscles and the nerve terminations.

(b) Details of attachments of the muscles; ultrastructural features of muscle; mechanism of the movement caused by the muscle/muscles and various forces exerted by them and their detailed action(s).

3. Arthrology

(a) Definition and classification of joints, general features of different types of joints; detailed study of major joints of the limbs and movements performed at various joints in the body.

(b) Microscopic anatomy of articular cartilage; maintenance of articular cartilages; blood supply and nerve supply of the joints.

4. Cardio Vascular System

(a) Normal position, external features and parts of the heart; internal features of the chambers of heart, names of the blood vessels and venous drainage of the organs, structures and body as a whole, conducting system of heart, fibroskeleton of heart.

(b) Variation(s), developmental anomalies of heart and blood vessels, valvular defects and their effects in pathogenesis of the anomalies.

5. Respiratory System

(a) Position, parts, relations, blood supply of upper and lower respiratory tract. Pleura, its reflection, nerve supply, pleural recesses and their significance, bronchopulmonary segments, their importance.

(b) Mechanism of respiration

6. Digestive System

(a) Position, extent, parts, relations, blood supply, nerve supply, lymphatic drainage and sphincters of the gastrointestinal system.
(b) Sphincteric action including functional implications.

7. Genito-Urinary System

(a) Parts, position, relations, blood supply, nerve supply and lymphatic drainage of uterus, cervix, vagina, ovary, fallopian tubes, testes, epididymis, seminal vesicle, ductus deferens, prostate, kidney, ureter, urinary bladder and urethra
(b) Innervation of urinary bladder in detail

8. Endocrine System and Individual Endocrine Glands

(a) Various endocrine glands, their location, relations, blood supply, nerve supply and lymphatic drainage.
(b) Clinical manifestations of common endocrine disorders.

9. Nervous System and its components

(a) Parts of nervous system, neuron meninges, nerve terminals, neuroglia, myelination, degeneration and regeneration, ventricles, CSF, spinal cord and its blood supply. Motor and sensory pathways, cranial nerves, thalamus, cerebellum, limbic and autonomic pathways. Functional cortical areas, motor and sensory cortex and their blood supply.

10. Special Sensory Organs

(a) Gross Anatomy of :

(i) eye ball, extra ocular muscles their nerve supply and actions (s)
(ii) ear
(iii) nose
(iv) tongue, its musculature blood supply and lymphatic drainage.

11. Lymphatic System

(a) Location of the major groups of the lymphnodes of the body and their drainage areas. Gross anatomy of the major lymphatics specially thoracic duct and its tributaries.

12. Surface Anatomy

(a) Surface features of the body and projection of the outline of heart, its borders, surfaces and valves, lungs, their borders, fissures and hila, pleura, liver, kidneys and various abdominal and pelvic organs and important vessels and nerves

13. Cross Sectional Anatomy

Cross sections of thorax, abdomen and pelvis to understand the interrelationship of organs and structures.

II. MICROANATOMY
III. EMBRYOLOGY
III. A General Embryology
III.B Systemic Embryology

BIOCHEMISTRY
BIOLOGICAL CELL

(a) Architecture, compartmentation, cell membrane structure and functions; structurefunction relationships.
(b) Membrane transport.

BIOMOLECULES

(a) Function and classification of carbohydrates, lipids, protein and amino acids.
(b) Stereoisomerism and chemistry of monosaccharides, amino acids, and fatty acids.
(c) Structural organization and structure-function relationships of proteins. Hemoglobin and myoglobin, molecular mechanism of O2 transport and storage. Molecular basis of sickle cell anaemia and thallesemias.
(d) Molecular mechanism of muscle contraction.
(e) Plasma proteins, their functions and clinical significance.

ENZYMES

(a) Nomenclature, classification,
(b) Kinetics, mechanism of enzymatic catalysis.
(c) Factors influencing enzymatic catalyses, enzyme activators and inhibitors.
(d) Regulation of enzyme activity,
(e) Clinical enzymology, isoenzymes.
Metabolic pathways, their regulation and metabolic interrelationships

METABOLISM: GENERAL CONCEPTS AND CHARACTERISTICS OF METABOLIC PATHWAYS.

Carbohydrate metabolism

(a) Pathways of glucose metabolism: glycolysis
(b) HMP shunt
(c) Gluconeogenesis
(d) Glycogenolysis, glycogenesis
(e) Galactose and fructose metabolism
(f) Glycogen storage disease
(g) Inborn errors of glucose metabolism
(h) Regulation of glucose metabolism.

Amino acid metabolism

(a) General reactions, transamination, its metabolic and diagnostic significance
(b) Disposal of amino acid nitrogen and detoxication of urea
(c) Metabolic fate of amino acid carbon skeleton
(d) Sulphur containing amino acids
(e) In born errors of branched chain and aromatic amino acids
(f) Important amino acid derivatives.

Lipid metabolism

(a) Biosynthesis and degradation of fatty acids, phospolipids and triacylglycerols
(b) Biosynthesis of cholesterol, chemistry and metabolism of lipoproteins.
(c) Hyperlipoproteinemias
(d) Lipid storage disease.
(e) Ketone bodies: their synthesis, utilization and conditions leading to ketoacidosis, prostaglandin.

TCA cycle and biological oxidation, prostanoids.

Regulation of the metabolic pathways

(a) Carbohydrate, lipid and amino acid metabolism
(b) Interlinks between these pathways.
(c) Organ interrelationships in metabolism,
(d) Blood glucose regulation, and its impairment in diabetes mellitus.
(e) Metabolic adaptation in the fed state, fasting and prolonged starvation.
(f) Metabolic derangements and adaptations in diabetes mellitus.

FOOD ASSIMILATION AND NUTRITION

(a) Digestive enzymes, their action on dietary carbohydrates, fats and proteins.
(b) Absorption of glucose, amino acids and lipids.
(c) Gastric, pancreatic and intestinal function tests, liver function tests.
(d) Functions of dietary ingredients, the macro and micronutrients.
(e) Fat soluble and water soluble vitamins
(f) Malnutrition
(g) Iron metabolism and heme synthesis.

HORMONES

(a) Molecular basis of hormonal action, signal transduction mechanisms.
(b) Chemistry, functions and mechanism of action of hormones of the pituitary, thyroid, parathyroid, adrenals, panaceas, and gonads.
(c) Biosynthesis of steroid hormones their functions and mechanism of action.
(d) Pineal body
(e) Endorphins and encephalins,
(f) Calcium homeostasis.
(g) Hormonal interplay in the regulation of metabolism.

MOLECULAR BIOLOGY

(a) Nucleic acids: DNA and RNA structure
(b) DNA Replication,
(c) DNA Transcription
(d) Post-transcriptional processing.
(e) Translation of genetic code
(f) Regulation of gene expression and protein synthesis inhibitors of protein synthesis.
(g) DNA repair mechanisms,
(h) Applied aspects of purine and pyrimidine metabolism
(i) Genetic Engineering: Recombinant DNA technology
(j) DNA and diagnostics

(k) DNA repair mechanisms and related disorders
(l) Telomers, telomerases
(m) Inhibitors of DNA replication, apoptosis
pH, Buffer, physiological buffer systems

(a) Regulation of blood pH, acidosis, alkalosis,
(b) Renal functions tests.

IMMUNOLOGY

(a) Reticuloendothelial system, components and functions of the innate and adaptive immunity.
(b) Role of T and B lymphocytes, antigen presentation
(c) Induction of immune response
(d) Cell mediated immune response
(e) Immunoglobulin structure and functions
(f) Humoral immune response
(g) Fate of antigen antibody complex,
(h) Complement system
(i) Generation of antibody diversity,
(j) Hypersensitivities
(k) Immunoregulation, autoimmunity, tolerance
(l) HLA, disease association & transplantation
(m) Immunological techniques, application in medicine (vaccines, immunotherapy, immunoassays and immunodiagnostics).

ENVIRONMENTAL BIOCHEMISTRY, CANCER AND CANCER MAKERS

(a) Xenbiotics, interaction with biomolecules, effects, metabolism, detoxication,
(b) Biochemical characteristics of cancer
(c) Environmental pollutants and carcinogenensis.

PHYSIOLOGY
NERVE–MUSCLE

1. Physicochemical properties of cell membrane
2. Cell membrane: permeability & transport
3. Principles of bioelectricity
4. Genesis of resting membrane potential
5. Action potential
6. Properties of nerve-fibres
7. Functional anatomy of neuromuscular junction
8. Neuromuscular transmission
9. Muscle proteins – (Biochemistry)
10. Excitation – contraction coupling
11. Contraction kinetics of skeletal muscles
12. Smooth muscle
13. Injury & repair of nerves and muscles
14. Energetics of nerve & muscle
15. Work Physiology

BLOOD

1. Functions of plasma proteins

2. Principles of hemopoiesis
3. Regulation of erythropoiesis
4. Destruction of red cells: Jaundice
1. Anemia
5. Regulation of WBC production
6. Functions of WBC
7. Functions of platelets
8. Hemostasis
9. Blood groups
10. Physiological basis of transfusion medicine

RESPIRATORY SYSTEM

1. Lung volumes and capacities
2. Mechanics of respiration
3. Composition of respired air: pulmonary ventilation
4. Exchange of gases in the lungs
5. Ventilation – perfusion ratio
6. O2
   carriage, O2
   –dissociation curve
7. CO2
   carriage, CO2
   –dissociation curve
8. Neural regulation of respiration
9. Chemical regulation of respiration
10. Hypoxia, cyanosis and dyspnoea
11. Special features of pulmonary circulation
12. Artificial respiration Artificial respiration
13. Therapeutic use of oxygen.

CARDIOVASCULAR SYSTEM

1. Introduction to CVS
2. Properties of cardiac muscle
3. Action potential and spread of impulse in the heart
4. E-C coupling in the myocardium
5. ECG
6. Pressure changes in the heart. Cardiac cycle
7. Functional basis of heart sounds and murmurs
8. Neural regulation of cardiac activity
9. Regulation of heart rate
10. Intrinsic regulation of heart's action. Cardiac output
11. Cardiac output: measurement and regulation
12. Nutrition and metabolism of heart
13. Exercise physiology
14. General principles of hemodynamics
15. Cardiovascular reflexes
16. Neural control of circulation
17. Special features of cerebral circulation
18. Special features of circulation in skeletal muscles and skin

GASTROINTESTINAL SYSTEM

1. Introduction to G.I. Physiology: general organization of G.I. tract
2. Mastication and deglutition
3. Gastric secretion
4. Regulation of gastric secretion
5. Pathophysiology of peptic ulcer
6. Biliary and pancreatic secretions
7. Physiology of colon
8. Pathophysiology of diarrheal disease

NUTRITION

1. Introduction to nutrition. RMR
2. Carbohydrates and dietary fiber
3. Proteins
4. Fats
5. Recommended dietary allowances
6. Diet during pregnancy and lactation
7. Diet during infancy and childhood

Environmental Physiology

1. Body temperature regulation
2. Man in cold environment
3. Man in hot environment
4. Hypothermia and its clinical applications
5. Physiological responses to high attitude
6. Physiological responses to high atmospheric pressure

REPRODUCTION

1. Introduction to reproductive system
2. Male reproductive physiology
3. Female reproductive physiology
4. Hypothalamic – pituitary – gonadal axis
5. Puberty
6. Pregnancy
7. Parturition and lactation
8. Reproductive ageing

KIDNEY

1. Renal hemodynamics and glomerular filtration
2. Renal tubular function
3. Regulation of renal function
4. Physiological basis of renal function tests
5. Micturition

NEUROPHYSIOLOGY

General
Sensory system

Motor system
Visceral and motivational system
EEG, sleep and higher nervous functions
Special Senses

FORENSIC MEDICINE & TOXICOLOGY

1. FORENSIC PATHOLOGY

Definition of Forensic Medicine, State Medicine, Legal Medicine and Medical Jurisprudence. History of Forensic Medicine.

1. Criminal procedure code, Criminal cases, Civil cases, Definition of Inquest , Different types of inquest procedures police inquest, magistrate's inquest. Cognizable and non cognizable offences, Different types of courts in India and their powers – Supreme court, High Court, Session Court, Magistrate's court. Court procedures: Summons, oath, affirmation, conduct money, types of witnesses, types of examination in court. Examination in chief, Cross examination, Re-examination, court questions, Evidence – Oral, Documentary, Medical evidence, Medical Certificate, Dying declaration, Dying deposition, Conduct of a doctor in witness box and Examination of dead body at the scene of crime.

2. Definition of death, Types of death-Somatic/Clinical/Cellular, Molecular and Brain death including cortical death and Brainstem death, Natural and Unnatural death, Suspended animation Moment of death, Modes of death – Coma, Syncope and Asphyxia, Presumption of death and Survivorship and Sudden death.

3. Description of signs of death. Post-mortem changes after death –cooling of dead body, post-mortem lividity, rigor mortis, cadaveric spasm, heat and cold stiffening, putrefaction, mummification, adipocere formation maceration and preservation of dead bodies.

4. Estimation of time since death on postmortem examination.

5. Examination of mutilated bodies or fragments, bundle of bones and exhumation.

6. Definition of postmortem examination, Different types of autopsies, aims and objectives of postmortem examination, Legal requirements to conduct postmortem examination, Procedure to conduct medicolegal postmortem examination, obscure autopsy, examination of clothing, preservation of viscera on postmortem examination for chemical analysis and other medicolegal purposes, postmortem artefacts.

7. Definition and classification of asphyxia, medico-legal interpretation of postmortem findings in asphyxial deaths.

8. Definition and types of hanging and strangulation. Description of clinical findings, causes of death, postmortem findings and medico-legal aspects of death due to hanging and strangulation. Examination and despatch of ligature material.

9. Definition, pathophysiology, clinical features, postmortem findings and medicolegal aspects of traumatic asphyxia, obstruction of nose & mouth, suffocation, sexual asphyxia.

10. Definition, types, pathophysiology, clinical features, postmortem findings and medicolegal aspects of drowning, diatom test, Gettler test.

11. Clinical features, postmortem finding and medico legal aspects of injuries due to physical agents heat (heat-hyper-pyrexia, heat stroke, sun stroke, Heat exhaustion (Prostration), heat cramps (miner's cramp)), cold (hypothermia, Frostbite, trench foot, Immersion foot), lightening, electrocution and radiations.

12. Clinical features, postmortem findings and medicolegal aspects of death due to starvation and neglect. Types of injuries, clinical features, pathophysiology, postmortem findings and medicolegal aspects in cases of burns and scalds.

13. Definition of infanticide, foeticide and stillbirth. Signs of intrauterine death, Signs of live birth, viability of foetus, age determination of foetus, demonstration of ossification centres, precipitate labour, Haase's rule, Hydrostatic test, maceration, Sudden infants death syndrome, Munchausen's syndrome by proxy.

2. CLINICAL FORENSIC MEDICINE

1. Establishment of identity of living persons – Definition of Corpus Delicti, Race, sex, religion, complexion, stature, age determination using morphology, teeth-eruption, decay, bite marks, bones ossification centres, medicolegal aspects of age. Foetal age determination, Identification of criminals, unknown persons, dead bodies from the remains-hairs, fibers, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy and Superimposition.

2. Definition and classification of injuries, Various types of injuries. Abrasion, bruise, laceration, stab wound, incised wound, chop wound, defence wound, self inflicted/fabricated wounds and their medicolegal aspects.

3. Description of regional injuries to head (Scalp wounds, fracture skull, Intracranial haemorrhages, Coup and contrecoup injuries), Neck, Chest, Abdomen, Limbs, Genital organs, Spinal cord and skeleton, Vehicular injuries–Primary and Secondary impact, Secondary injuries, crush syndrome, railway spine, reconstruction of scene of crime.

4. Definition of Injuries. IPC pertaining to injuries. Accidental, Suicidal and Homicidal Injuries. Types of Injuries – Simple ,Grievous and Dangerous. Different types of weapons, Dangerous weapons and their examination. Antemortem and Potmortem Inuries, Medicolegal aspects of injuries. Factors influencing, Infliction of Injuries and Healing, Different legal questions, examination and certification of wounds, Wound as a cause of death: Primary and Secondary. Dowry death. Workman's Compensation Act.

5. Firearm injuries. Classification of fire-arms. Structure and components of various firearms, description of ammunition propellant charge and mechanism of fire-arms, Various terminology in relation of firearm – calibre, range, choking. Description of different types of cartridges and bullets.

6. Description of wound ballistic, blast injuries and their interpretation. Preservation and despath of trace evidences in cases of firearm and blast injuries. Various test related to confirmation of use of firearms.

7. Definition and types of sexual offences, Definition of rape. Section 376 IPC, Examination of the victim of an alleged case of rape, Examination of the accused of an alleged case of rape, preparation of report and framing the opinion in rape cases, preservation and despatch of trace evidences in cases of rape. Adultery, Unnatural Sexual offences Sodomy, Examination of accused and victim, preparation of report and framing of opinion, preservation and despath of trace evidences in cases of sodomy, incest, lesbianism, buccal coitus, bestiality, indecent assault. Sexual

perversions. Fetichism, transvestism, voyeurism, sadism necrophagia, masochism, exhibitionism, frotteurism, necrophillia.

8. Definitions of Impotence, Sterility, Frigidity, Sexual Dysfunction, Premature Ejaculation, Causes off orensic Medicine & Toxicology Impotence and sterility in male and female, Sterilization, Artificial Insemination, Surrogate mother, Delhi Artificial Insemination act 1995.

9. Definition of Virginity and defloration, anatomy of male and female genitalia, Hymen and its types, Medicolegal importance of hymen, Medicolegal importance of pregnancy, diagnosis of pregnancy, Superfoetation, superfecundation, Definition of Legitimacy and its medicolegal importance, Diputed paternity and maternity, Medicolegal aspects of delievery, Signs of delievery, Signs of recent and remote delievery in living and dead.

10. Definition, Classification and complication of abortion, MTP act 1971, Methods of procuring criminal abortion, Evidences of abortion-Living and Dead,Duties of doctor in cases of abortion.

11. Battered baby syndrome.

3. MEDICAL JURISPRUNDENCE

1. Medical council of India, state medical councils- Their functions and disciplinary control. Laws in relation to medical practice, duties of medical practitioner towards the patients and society. Indian Medical Register, rights priviliges of medical practitioner, penal erasure, infamous conduct, disciplinary committee, warning notice & euthanasia.

2. Code of medical ethics, unethical practices, dichotomy, consumer protection act, Prenatal diagnostic techniques act, Human organ transplantation act, ESI act, medicolegal issues in relation to family violence, Violation of human rights, NHRC and doctors, Doctors and media, ethics related to HIV patients.

3. Malpractice- Civil, Criminal and ethical

4. Consent, kinds of consent, informed consent, negligence, vicarious liability, the doctrine of res Ipsa Loquitor, Contributory Negligence, Therapeutic Privilige, Rules of Consent, Malingering, Therapeutic Misadventure, corporate negligence, Professional negligence, Professional Secrecy, Human Experimentation, IPC related to medical Practice, Products liability, Medical Indemnity Insurance, Medical records.

4. FORENSIC PSYCHIATRY

1. Definition, Various types of mental disorder, Lucid interval, Classification of mental disorder, mental sub normality, Diagnosis of Insanity and Feigned insanity, Restraint, admission and discharge of Insane in accordance to Mental Health act 1994, Mental disorder and responsibility-Civil and Criminal responsibility, Testamentary Capacity, Mc Naughten‘s rule.

5. FORENSIC SCIENCES

1. Definition of DNA fingerprinting, Techniques of DNA Fingerprinting, Application of DNA profiling in forensic Medicine, HLA typing.

2. Locard’s exchange principle, Examination, preservation, despatch and identification of blood, Seminal stains (Physical, microscopic, chemical and serological test, blood grouping) and

its medicolegal aspects, Saliva, vaginal fluid, faecal and urinary stain, examination of skin, nail tooth pulp and other body fluids group specific substances, hazards of blood transfusion.

B. TOXICOLOGY

1. GENERAL TOXICOLOGY
2. CLINICAL TOXICOLOGY
3. ENVIRONMENTAL TOXICOLOGY
4. ANALYTICAL TOXICOLOGY

MICROBIOLOGY
INTRODUCTION TO MICROBIOLOGY

(i) Natural history of microbial diseases.
(ii) Unique differentiating features of eukaryotes and prokaryotes
(iii) Source and spread of microbes
(iv) Rationale for classifying microbes into bacteria, fungi viruses, parasites.

2. INTRODUCTION TO BACTERIOLOGY

– The nature of bacteria
– Morphological differences
– Growth requirement
– Nomenclature and classification
– Enumeration of bacteria responsible for certain primary diseases.

3. BACTERIAL STAINING AND CULTIVATION
– Microscopy : types and principles
– Staining : principles
– Media for growth / bacterial colony
– Familiarization with materials used

4. COMMON TESTS FOR BACTERIAL IDENTIFICATION

–Various types of staining such as simple, differential staining; different procedures of staining and their principles
– Motility testing
–Common sugar fermentation and other biochemical tests such as Catalase/ Coagulase/citrate utilization/ nitrate reduction / urease/ PPA/ OF/ Indole etc.
– Sensitivity testing

5. INTRODUCTION TO PARASITOLOGY

– Biology of protozoa
– Protozoan parasites causing human infection
– Medically important helminths
– Ectoparasites

6. INTRODUCTION TO VIROLOGY
– The nature and properties of viruses
– Classification of viruses
– Morphology

7. LABORATORY DIAGNOSIS OF VIRAL INFECTION

– Brief appraisal of pathogenicity of viruses
– Culture methods
– Cytopathic effects
– Inclusion bodies
– Animal inoculation
– Serological test (CFT, HAI, neutralisation)

8. INTRODUCTION TO MYCOLOGY
– Nature of fungi: basic structures and classification
– Superficial mycoses
– Subcutaneous mycosis
– Systemic fungal infections with opportunistic mycosis

9. COMMON LABORATORY METHODS FOR DIAGNOSIS OF FUNGAL INFECTIONS

(i) KOH preparation with principles
(ii) Lactophenal cotton blue preparation
(iii) Negative staining and procedures
(iv) Special staining and procedures
(v) Culture of fungi
(vi) Serodiagnosis

10. COLLECTION & TRANSPORT OF SAMPLES
– Collection of clinical samples
– Transport of various appropriate clinical samples.
– Transport media
– Description of container with contents or no contents.
– Preliminary processing of clinical samples

11. HOST-PARASITE RELATIONSHIP

– Presence of normal flora
– Enumeration and explanation of various host-parasite interaction
– Mechanism of pathogenesis adhesion/ colonisation/ virulence and toxigenicity
– Host response
– Koch's postulates

12. BACTERIAL AND VIRAL GENETICS

– Structure and replication of bacterial DNA
– Plasmids
– Transfer of genetic materials Microbiology
– Mutations
– Viral replication
– Interactions among viruses (recombination, genetic reactivation, complementation etc).
– Epidemiology of viral infection
– Recombinant DNA technology

13. IMMUNITY TO INFECTION
– Normal immune system
– Innate Immunity

– Antigens – presentation and association in immunity
– Immunoglobulins and their role in immunity
– Cell mediated immunity and their role
– Hypersensitivity
– Immunodeficiency
– Tolerance

14. IMMUNODIAGNOSIS
– Antigen-antibody reactions in infectious diseases and diagnostic tests based on these.

15. VACCINES

16. STERILISATION AND DISINFECTION

17. BACTERIOLOGY OF WATER AND AIR INFECTIONS OF GASTROINTESTINAL TRACT

18. Microorganisms associated with gastrointestinal infections.
(Bacteria, parasites, viruses and fungi).
19. Gastrointestinal infections caused by parasites
19a. Amoebiasis
- Entamoeba spp
- Naegleria spp
- Acanthamoeba spp
19b. Amoebiasis (Micro, Gastro, Surg, Paeds)
19c. Other intestinal protozoal infections (Micro, Gastro, Paeds)

PATHOLOGY

(A) GENERAL PATHOLOGY

2. Cell Injury
(a) Cell injury: Causes and Mechanism: Ischemic, Toxic.
(b) Reversible cell injury: Types, morphology: Swelling, vacuolation, hyaline, fatty change.
(c) Irreversible cell injury : Types of Necrosis

3. Amyloidosis and Calcification
(a) Calcification : Dystrophic and Metastatic
(b) Amyloidosis : classification, Pathogenesis, Morphology

4. Inflammation and Repair
(a) Acute inflammation : Features, causes, vascular and cellular events.
(b) Morphologic variants of acute inflammation
(c) Inflammatory cells and Mediators
(d) Chronic inflammation: Causes, types, nonspecific and Granulomatous with examples
(e) Wound healing by primary and secondary union, factors promoting and delaying the process
(f) Healing at specific sites including bone healing

5. Circulatory Disturbances
(a) Edema : Pathogenesis and types

(b) Chronic venous congestion : Pathogenesis and changes in Lung, Liver, Spleen
(c) Thrombosis and Embolism : Formation, Fate and Effects
(d) Infarction : Types, common sites, Gangrene
(e) Shock : Pathogenesis, Types, Morphologic changes
(f) Derangements of Fluid and electrolyte imbalance

6. Growth Disturbances and Neoplasia
(a) Atrophy, Hypertrophy, Hyperplasia, Hypoplasia, Metaplasia, Malformation, Agenesis, Dysplasia
(b) Neoplasia: Classification, Histogenesis, Biologic Behaviour: Benign and Malignant; Carcinoma and Sarcoma
(c) Malignant Neoplasia: Grades and Stages, Local and distant spread
(d) Carcinogenesis: Environmental carcinogens, chemical, viral, occupational, Heredity and cellular oncogenes
(e) Tumour and Host Interactions : Systemic effects including paraneoplastic syndromes, Tumor immunology
(f) Laboratory diagnosis : Cytology, Biopsy, Tumor markers

7. Immunopathology
(a) Immune system : organisation, cells, antibodies and regulation of immune responses.
(b) Hypersensitivity : types and examples, Antibody and cell mediated tissue injury with examples.
c) Primary immunodeficiency
d) Secondary Immunodeficiency including HIV Infection Pathology
e) Auto-immune disorders like systemic lupus erythematosis; organ specific and non-organ specific such as polyarteritis nodosa, Hashimoto's disease.
(f) Tumor Immunity
(g) Organ transplantation : Immunologic basis of Rejection and Graft versus host reaction

8. Infectious Diseases
(a) Mycobacterial Diseases : Tuberculosis and Leprosy
(b) Bacterial diseases : Pyogenic, Typhoid, Diphtheria, Gram negative infection, Bacillary dysentery, Syphilis
(c) Viral : Polio, Herpes, Rabies, Measles; Rickettsial, Chlamydial infection
(d) Fungal diseases and opportunistic infections
(e) Parasitic Diseases: Malaria, Filaria, Amebiasis, Kala-azar, Cysticercosis, Hydatid
(f) AIDS: Aetiology, modes of transmission, diagnostic procedures and handling of infected material and health education.

9. Miscellaneous Disorders
(a) Autosomal and sex-linked disorders with examples
(b) Metabolic disorders
(c) Protein energy malnutrition and vitamin deficiency disorders
(d) Radiation Injury
(e) Disorders of Pigment and Mineral metabolism such as bilirubin, melanin, hemosiderin

(B) SYSTEMIC PATHOLOGY

1. Cardiovascular Pathology
(a) Rheumatic fever and Rheumatic Heart Disease : Pathogenesis, Morphology and effects
(b) Infective Endocarditis : Causes, Pathogenesis and Morphology
(c) Atherosclerosis and Ischemic Heart Disease; Myocardial Infarction

(d) Diseases of blood vessels other than atherosclerosis
(e) Hypertension and Hypertensive Heart Disease
(f) Congenital Heart Disease : ASD, VSD, Fallot's Bicuspid aortic valve, PDA
(g) Pericarditis and other pericardial diseases
(h) Cardiomyopathy

2. Respiratory Pathology
(a) Structure of Bronchial tree and alveolar walls, normal and altered lung function; concept of obstructive and restrictive lung disorders
(b) Inflammatory diseases of bronchi: chronic bronchitis, bronchial asthma, bronchiectasis, chronic obstructive lung disease
(c) Pneumonias : Lobar, Broncho, Interstitial
(d) Pulmonary suppuration including lung abscess : Etiopathogenesis and morphology
(e) Pulmonary Tuberculosis : Primary and Secondary, Morphologic types including pleuritis
(f) Emphysema : Types, pathogenesis
(g) Atelectasis and Hyaline Membrane Disease
(h) Tumors : Benign; Carcinoid, Malignant; Squamous cell, Oat cell, Adeno, etiopathogenesis.
(i) Occupational lung disorders : anthracosis, silicosis, asbestosis, mesothelioma

3. Urinary Tract Pathology
(a) Renal structure, basis of impaired function, urine analysis
(b) Glomerulonephritis: Classification, Primary Proliferative and Non Proliferative
(c) Secondary Glomerulonephritis: SLE, Purpura, Polyarteritis, Amyloidosis, Diabetes
d) Nephrotic Syndrome
(e) Acute Renal Failure : Acute tubular and cortical necrosis
(f) Progressive renal failure and end stage renal disease
(g) Pyelonephritis, Reflux Nephropathy, Interstitial Nephritis
(h) Renal tumors : Renal cell carcinoma, Nephroblastoma
(i) Renal vascular disorders, kidney changes in Hypertension
(j) Urinary bladder : cystitis, carcinoma
(k) Urinary Tract Tuberculosis
(l) Urolithiasis and Obstructive Uropathy
(m) Renal Malformations : Polycystic kidneys

4. Pathology of the Gastro-Intestinal Tract
(a) Oral Pathology : Leukoplakia; Carcinoma oral Cavity and Esophagus
(b) Salivary gland tumors : Mixed, Adenoid cystic, warthin's
(c) Peptic ulcer : etiopathogenesis and complications; gastritis: types
(d) Tumors of stomach: Benign; Polyp, Leiomyoma, Malignant; Adenocarcinoma, Lymphoma
(e) Inflammatory diseases of small intestine: Typhoid, Tuberculosis, Crohn's, Appendictis
(f) Inflammatory diseases of appendix and large intestine : Amoebic colitis, Bacillary dysentery, Ulcerative Colitis
(g) Ischemic and Pseudomembranous enterocolitis, diverticulosis
(h) Malabsorption : Celiac disease, Trophical sprue and other causes
(i) Tumours and Tumor like condition of the large and small intestine : Polyps, Carcinoid, Carcinoma, Lymphoma
(j) Pancreatitis
(k) Pancreatic tumors : Endocrine, Exocrine and periampullary

5. Hematopathology
   (a) Constituents of blood and bone marrow, Regulation of hematopoiesis
   (b) Anaemia : classification and clinical features; clinical and lab. approach to diagnosis Pathology
   (c) Nutritional anaemias : Iron deficiency anaemia, Folic Acid/Vit B 12 deficiency anaemia including pernicious anaemia
   (d) Hemolytic Anaemias : Classification and invesgiation
   (e) Hereditary hemolytic anaemias : Thalassemia, sickle cell anaemia
   (f) Hereditary hemolytic anaemias : hereditary spherocytosis, G-6-PD deficiency
   (g) Acquired hemolytic anaemias
   (h) Hemolytic Anaemias : Autoimmune, Alloimmune, Drug induced Microangiopathic and Malaria
   (i) Aplastic Anaemia, PNH and Myelodysplastic syndrome
   (j) Hemostatic disorders : Platelet deficiency; ITP, Drug induced, secondary
   (k) Coagulopathies : Coagulation factor deficiency; hemophilia, DIC and anticoagulant control
   (l) Leukocytic disorders : Leukocytosis, leukopenia, leukemoid reaction
   (m) Acute and chronic Leukemia : Classification, Diagnosis
   (n) Myeloproliferative disorders : Polycythemia, Myelofibrosis
   (o) Multiple myeloma and dysproteinemias
   (p) Blood transfusion : grouping and cross matching, untoward reactions, transmissible infections including HIV and hepatitis

6. Liver and Biliary Tract Pathology

   (a) Jaundice : Types, Pathogenesis and Differentiation
   (b) Hepatitis : Acute and Chronic, Etiology, Pathogenesis and Pathology
   (c) Cirrhosis: Etiology, Postnecrotic, Alcoholic, Metabolic, Pathology, Morphology (Macronodular, Micronodular, Mixed), complications
   (d) Portal Hypertension : Types including non-cirrhotic portal fibrosis and Manifestations
   (e) Tumors of Liver : hepatocellular and metastatic carcinoma, tumor markers
   (f) Concept of hepatocellular failure
   (g) Diseases of the gall bladder : Cholecystitis, Cholelithiasis, Carcinoma

7. Lymphoreticular System
   (a) Lymphadenitis : nonspecific, Granulomatous
   (b) Hodgkin's and Non-Hodgkin's Lymphomas : Classification, Morphology
   (c) Diseases of the spleen : Splenomegaly causes and effects
   (d) Thymus : Dysgenesis, Atrophy, Hyperplasia, Neoplasia

8. Reproductive System

   (a) Diseases of cervix : cervicitis, cervical carcinoma, etiology, types and cytologic diagnosis
   (b) Hormonal influences and histological appearances of different phases of menstrual cycle and the abnormalities associated with it
   (c) Diseases of uterus : endometritis, endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumors
   (d) Trophoblastic disease : Hydatidiform mole, Choriocarcinoma
   (e) Diseases of the breast : Mastitis, abscess, Fibrocystic disease, Neoplastic lesions : Fibroadenoma, Carcinoma, Phyllodes tumor
   (f) Prostate : Nodular Hyperplasia and Carcinoma

(g) Ovarian and testicular tumors
(h) Carcinoma of penis
(i) Pelvic inflammatory diseases including salpingitis
(j) Genital Tuberculosis

9. Osteopathology

(a) Bone – general considerations, reactions to injury and healing of fractures
(b) Osteomyelitis : Acute, Chronic, Tuberculous, Mycetoma
(c) Metabolic diseases: Rickets / Osteomalacia, Osteoporosis, Hyperparathyroidisism
(d) Tumors : Primary, Osteosarcoma, Osteoclastoma, Ewing's Sarcoma, Chondrosarcoma; Metastatic
(e) Arthritis : Rheumatoid, Osteo and tuberculous

10. Endocrine Pathology
(a) Scope of endocrine control and investigations
(b) Diabetes Mellitus : Types, Pathogenesis, pathology
(c) Nonneoplastic lesions of thyroid : Iodine deficiency goiter, autoimmune thyroiditis, thyrotoxicosis, myxedema
(d) Tumors of thyroid – adenoma, carcinoma : Papillary, Follicular, Medullary, Anaplastic
(e) Adrenal diseases : Cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla
(f) Parathyroid hyperplasia and tumors and Hyperparathyroidism
(g) Pituitary tumors
(h) Multiple endocrine neoplasia

11. Neuropathology
(a) Structural Organization, specific cell types, and reaction patterns
(b) Inflammatory disorders : Pyogenic and tuberculous meningitis, brain abscess, tuberculoma
(c) CNS tumors – primary : glioma and meningioma (excluding histopathology) and metastatic
(d) CSF and its disturbances : cerebral edema, raised intracranial pressure
(e) Cerebrovascular diseases : Atherosclerosis, thrombosis, embolism, aneurysm, Hypoxia, Infarction and Hemorrhage
(f) Peripheral neuropathies and demyelnating disorders
(g) Diseases of muscles
(h) Traumatic lesions of CNS

PHARMACOLOGY

A. GENERAL PHARMACOLOGY

(A) Absorption, distribution, metabolism and elimination of drugs, routes of drug administration

(B) Basic principles of drug action

(C) Adverse reactions to drugs

(D) Factors modifying drug response

B. AUTONOMIC NERVOUS SYSTEM & PERIPHERAL NERVOUS SYSTEM

(a) Neurohumoral transmission
(b) Sympathetic nervous system - sympathomimetics, sympatholytics
(c) Parasympathetic - Cholinergics, Anticholinergics, Ganglion stimulants and blockers
(d) Skeletal muscle relaxants
(e) Local anaesthetics

C. CENTRAL NERVOUS SYSTEM

(a) General principles - neurotransmitters, definition and common transmitters
(b) Drug therapy of various CNS disorders like epilepsy, depression, Parkinson's disease, schizophrenia, neuro-degeneration etc.
(c) Pharmacotherapy of pain
(d) General anaethetics
(e) Drugs for arthritides & gout

D. AUTACOIDS

(a) Histamine and antihistaminics
(b) Prostaglandins, leukotrienes, thromboxane and PAF
(c) Substance P, bradykinin

(E) CARDIOVASCULAR SYSTEM

(a) Drug therapy of hypertension, shock, angina, cardiac arrhythmias
(b) Renin angiotensin system
(c) Diuretics
(d) Coagulants and anticoagulants, antiplatelet drugs
(e) Hypo-lipidemics

(F) GASTROINTESTINAL AND RESPIRATORY SYSTEM

(a) Emetics and antiemetics
(b) Drugs for constipation and diarrhoea
(c) Drug treatment of peptic ulcer
(d) Drug therapy of bronchial asthma
(e) Pharmacotherapy of cough

(G) Hormones

(a) Reproductive hormones - testosterone, estrogen, progesterone, contraceptives
(b) Drug therapy of Diabetes
(c) Thyroid hormones Pharmacology
(d) Pituitary-hypothalamic axis
(e) Corticosteroids
(f) Oxytocin and drugs acting on uterus
(g) Drugs affecting calcium balance

(H) CHEMOTHERAPY

(a) General principles of antimicrobial chemotherapy, rational use of antibiotics
(b) Chemotherapeutic agents - Penicillins, cephalosporins, fluoroquinolones, macrolides, aminoglycoside, tetracyclines, chloramphericol and polypeptide antibiotics etc.
(c) Chemotherapy of tuberculosis, leprosy, UTI
(d) Chemotherapy of parasitic infection
(e) Chemotherapy of fungal infections
(f) Cancer Chemotherapy

(I) MISCELLANEOUS
(a) Immunomodulators
(b) Drug therapy of glaucoma and cataract
(c) Treatment of poisoning

PAPER-II

1. Community Medicine
2. Dermatology & Venereology
3. Medicine & Allied
4. Obstetrics & Gynaecology
5. Ophthalmology
6. Orthopaedics
7. Otorhinolaryngology
8. Paediatrics
9. Surgery

COMMUNITY MEDICINE

1. BEHAVIORAL SCIENCES
Culture, Society and Health
• Role of Family in health and disease
• Health, illness behaviour
• Social Organization and Community Participation
• Measurement of Socioeconomic Status and its importance in relation to health and disease.
• Questionnaire/Interview schedule designing
• Practical: Construction and pre-testing of questionnaire/ interview schedule
• Attitudes: nature, development, methods to change
• Measurement of attitudes
• Questionnaire design to test attitudes.

2. HEALTH EDUCATION
– Definition and principles of health education
– Health educational methods
– Audiovisual aids
– The art of communication
– Skills of communication
– Methods of overcoming resistance in the individual, family and community.
– Planning a health educational programme
– Use of other aids in health education
– Evaluation of health educational activities
– Information Education Communication Strategies

3. ENVIRONMENT
• Environment:
– housing
– physical environment inside and outside the home
– family environment
• Water
• Waste
• Air pollution, green house effect, ozone layer

- Noise and radiation pollution
- Vectors of disease
- Vector Control and insecticidal resistance.

4. BIOSTATISTIC
- Need of Bio-statistics in Medicine
- Statistical Methods
- Frequency Distribution
- Measures of Central Tendency.
- Proportions
- Tabular & diagrammatic presentation of data probability
- Normal Distribution
- Standard error estimation
- Tests of Significance
- Alpha, Beta error
- Confidence Interval
- Bias/Random errors
- Sample size calculation
- Sampling methods

5. EPIDEMIOLOGY
- Definitions, scope in hospital, community, planning
- Measures of Morbidity/Mortality
- Rates: Incidence, Prevalence
  - Death rate
  - Crude rates/standardized rates
  - Fertility Rates Years
  - Person Years
  - Ratio
  - Proportions
  - Risk
  - Sources of epidemiological data
  - Causation
  - Natural history of disease for communicable and non-communicable diseases.
  - Levels of disease prevention
  - Clinico-psycho-social case review
  - Principles of control of communicable disease
  - Principles of control of non-communicable disease
  - Measurement
  - Screening Tests
  - Diagnostic Tests
  - Cross sectional and case studies
  - Longitudinal study
  - Case control study
  - Randomized Control Trials

6. NUTRITION

- Role of nutrition in health and disease
- Nutritional requirements and sources
- Balanced Diet
- Deficiency Disorders and Micronutrient Deficiencies

- Salt fortification
- Protein Energy Malnutrition
- Nutritional problems in India
- Nutritional programmes
- Assessment of nutritional status in community; Growth Charts.

7. MATERNAL & CHILD HEALTH
- Magnitude of the problem
- Maternal morbidity and mortality, under five morbidity mortality.
- Breast feeding/Weaning
- High risk mothers and children
- Family Planning Methods: Spacing and Terminal Methods and emergency contraception

8. REHABILITATION
- Need for Rehabilitation. Types of rehabilitation. Types of impairment, disability, handicap
- Assessment of Postpolio Residual Paralysis
- Rehabilitation at individual level
- Community based rehabilitation

9. EPIDEMIOLOGY OF COMMUNICABLE DISEASES AND NONCOMMUNICABLE DISEASES
- Malaria
- STDs / HIV/AIDS
- Pulmonary Tuberculosis
- Leprosy
- Diphtheria, Pertussis, Tetanus
- Poliomyelitis
- Measles, Mumps & Rubella
- Chicken, A.R.I.
- Diarrhoeal Diseases
- Infective Hepatitis
- Kala azar
- Arbo viral diseases
- Filaria
- Plague
- Intestinal infestations
- Investigation of an Epidemic
- Immunity
- Immunization schedule
- Cold chain
- Immunization for international travel
- Surveillance for diseases
- Nutritional Disorders
- RHD /CHD / Hypertension
- Cancers
- Blindness
- Road Traffic Accidents
- Diabetes mellitus
- Obesity Community Medicine

10. IMPORTANT NATIONAL HEALTH PROGRAMMES
- Health Programmes on:

- RCH (including ARI, Diarrhoeal Diseases)
- Immunization
- Family Welfare
- Iodine Deficiency
- Nutrition, ICDS
- Tuberculosis
- Malaria, Filaria, Kala Azar
- Evaluation of a health programme
- HIV/ AIDS & STDs
- Leprosy
- RHD/ CHD/ Hypertension
- Diabetes
- Blindness
- Cancer

11. OCCUPATIONAL HEALTH
– Working environment, health hazards of industrial and agricultural workers
– Common occupational lung diseases
– Common occupational skin diseases and cancers
– Industrial Toxic Substances
– Principles of prevention of Occupational diseases
– Legal status in relation to Workman Compensation Act
– Employees' State Insurance Act

12. HEALTH ADMINISTRATION
– Planning and organizational set up of health services in India
– Primary Health Care
– Health Team at District Hospital, Community Health Primary Health Centre
– School Health
– Management of health resources
– Voluntary and international agencies in health care
– Natural and manmade disasters and disaster management

13. HEALTH ECONOMICS
– Need of health economics
– Methods of economic analyses in health Community Medicine

14. GERIATRICS
- Problems of the elderly
- Social organizations to assist the elderly

15. COUNSELLING
- The students will observe counseling being done in the various situations

DERMATOLOGY AND VENEREOLOGY

1. Infective dermatoses: Pyoderma, tuberculosis and leishmaniasis- Etiology, Clinical features, Diagnosis and Treatment.

2. Infective dermatoses: Viral and fungal infections- Etiology, Clinical features, Diagnosis and Treatment.

3. Infestations: Scabies and pediculosis – Etiology, Clinical features, Diagnosis and Treatment.

4. Melanin synthesis: Disorders of pigmentation (Vitiligo, Chloasma / Melasma)- Etiology, Clinical features, Diagnosis and Treatment.

5. Allergic disorders: Atopic dermatitis and contact dermatitis – Etiology, Clinical features, Diagnosis and Treatment.

6. Drug eruptions, urticaria, erythema multiforme, Steven's johnson syndrome and toxic epidermal necrolysis – Etiology, Clinical features, Diagnosis and Treatment.

7. Vesiculo-bullous diseases: Pemphigus, Pemphigoid, Dermatitis herpetiformis – Etiology, Clinical features, Diagnosis and Treatment.

8. Epidermopoisis, Psoriasis, Lichen planus and Pityriasis rosea – Etiology, Clinical features, Diagnosis and Treatment.

9. Pathogenesis, Classification and clinical features of leprosy, Reactions in leprosy.

10. Diagnosis, treatment and control of leprosy.

11. Syphilis – Etiology, Clinical features, Diagnosis and Treatment.

12. Gonococcal and Non-gonococcal infections – Etiology, Clinical features, Diagnosis and Treatment.

13. Chancroid, LGV, Donovanosis, Herpes progenitalis – Etiology, Clinical features, Diagnosis and treatment.

14. Syndromic approach to the diagnosis and management of sexually transmitted diseases.

15. HIV infection, Cutaneous manifestations of HIV infection and their management.

16. Hereditary disorders: Ichthyosis, Albimism, Epidermolysis bullosa, Melanocytic naevi, Freckles and other naevi – Etiology, Clinical features, Diagnosis and Treatment.

17. Dermatological Emergencies.

MEDICINE & Allied Specialities

Clinical genetics - common types, clinical presentation, investigation and prevention of genetic diseases and genetic counseling
Medical disorders during pregnancy
Principles of Geriatric Medicine
Clinical Pharmacology
Nutritional and metabolic disorders
Water, electrolyte and acid-base imbalance
Critical care Medicine
Physiology of the critically ill patient
Major manifestations of critical illness
Circulatory failure: shock
Respiratory failure
Renal failure Medicine

Coma
Sepsis
Disseminated intravascular coagulation
General principles of critical care management
Scoring systems in critical care
Outcome and costs of intensive care
Pain management and palliative care
General principles of pain
Assessment and treatment of pain
Palliative care
Medical Psychiatry
Classification of psychiatric disorders
Aetiological factors in psychiatric disorders
The clinical interview and mental state examination
Major manifestations of psychiatric illness
Disturbed and aggressive behaviour
Delusions and hallucinations
Depressive Symptoms
Anxiety symptoms
Deliberate self-harm and suicidal ideation
Alcohol misuse and withdrawal
Misuse of drugs other than alcohol
Medically unexplained physical symptoms and functional somatic syndromes
Psychiatric and psychological aspects of chronic and progressive disease
Clinical syndromes
Organic brain syndromes
Substance abuse
- Alcohol
- Drugs
Bipolar disorders
Depressive disorders
Schizophrenia
Treatments used in psychiatry
Psychological treatments
Physical treatments
Neurotic, stress-related and somatoform disorders
Anxiety
Obsessive compulsive disorders
Dissociative disorders
Sleep disorders
Legal aspects of psychiatry
Poisonings
General approach to the poisoned patient
Poisoning by specific pharmaceutical agents
Drugs of misuse
Chemicals and pesticides
Snake bite and Envenomation
Other bites and stings - scorpion, spider
Specific environmental and occupational hazards
Heatstroke and hypothermia
Drowning and near drowning
Electrical injuries

Radiation injury
Heavy metal poisoning
Immune response and Infections
Basic considerations
Patterns of infection
Laboratory diagnosis of infections
Principles of immunization and vaccine use
Clinical syndromes
The febrile patient
Fever and rash
Fever of unknown origin
Infective endocarditis
Intra-abdominal infections and abscesses
Acute infectious diarrhoeal diseases and food poisoning
Sexually transmitted diseases - overview & clinical approach
Infections of skin, muscle & soft tissues
Osteomyelitis Medicine
Hospital acquired infections
Infections in immuno-compromised hosts
Specific Infections - Epidemiology, clinical features, laboratory diagnosis, treatment and prevention of :
_ Protozoal infections
_ Amobiasis
_ Malaria
_ Leishmaniasis
_ Toxoplasmosis
_ Giardiasis
_ Trichomoniasis
_ Trypanosomiasis
_ Bacterial infections
_ Streptococcal infections
_ Pneumococcal infections
_ Staphylococcal infections
_ Meningococcal infections
_ Gonococcal infections
_ Legionella infections
_ Pertussis and Diphtheria
_ Tetanus
_ Botulism
_ Gas gangrene, other clostridial infections
_ Cholera
_ Salmonellosis - Typhoid and paratyphoid fevers
_ Shigellosis and bacillary dysentery
_ Brucellosis
_ Plague
_ Donovanosis (Granuloma inguinale)
_ Helicobacter Pylori
_ Infections due to pseudomonas & other gram - negative bacteria
_ Anaerobic infections
_ Mycobacterial diseases
_ Tuberculosis
_ Leprosy

_ Viral infections
_ Common exanthemata
- Measles
- Mumps
- Rubella
- Varicella
_ Common viral respiratory infections
_ Human immunodeficiency virus (HIV)
_ Viral gastroenteritis
_ Dengue fever
_ Rabies
_ Rickettsia, Mycoplasma & Chlamydial diseases
_ Fungal infections
_ Candidiasis
_ Aspergillosis
_ Histoplasmosis
_ Cryptococcosis
_ Mucormycosis
_ Pneumocystis carinii
_ Helminthic infections
_ Nematodes
- Tissue
- Intestinal
_ Cestodes
- Tissue
- Intestinal

SYSTEM-BASED DISEASES
Cardiovascular system
_ Clinical examination of the cardiovascular system
_ Functional anatomy, physiology and investigations
_ Major manifestations of cardiovascular disease
_ Chest pain
_ Breathlessness
_ Palpitation
_ Acute circulatory failure (cardiogenic shock)
_ Heart failure
_ Hypertension
_ Presyncope and syncope
_ Cardiac arrest and sudden cardiac death
_ Abnormal heart sounds and murmurs
_ Atrial fibrillation
_ Disorders of heart rate, rhythm and conduction
_ Congestive cardiac failure
_ Rheumatic fever
_ Valvular heart disease
_ Ischaemic heart disease
_ Congenital heart disease in the adult
_ Cor pulmonale
_ Hypertension
_ Peripheral vascular disease
_ Atherosclerosis

_ Pericardial disease
_ Myocarditis and cardiomyopathy

Respiratory system
_ Clinical examination of the respiratory system
_ Functional anatomy, physiology and investigations
_ Major manifestations of lung disease
_ Cough
_ Dyspnoea
_ Chest pain
_ Haemoptysis
_ The solitary radiographic pulmonary lesion
_ Respiratory failure
_ Upper and lower respiratory infections
_ Bronchial asthma
_ Chronic obstructive pulmonary disease
_ Pulmonary tuberculosis
_ Suppurative lung diseases
_ Bronchiectasis
_ Lung abscess
_ Plural effusion and empyema
_ Interstitial and infiltrative lung diseases
_ Occupational lung diseases
_ Tumors of the bronchus and lung
_ Pulmonary vascular diseases
- Pulmonary hypertension
- Pulmonary thromboembolism
_ Acute respiratory distress syndrome
_ Obstructive sleep apnoea
_ Diseases of the nasopharynx, larynx and trachea
_ Diseases of the mediastinum, diaphragm and chest wall

Kidney and genitourinary system
_ Clinical examination of the kidney and genitourinary system
_ Functional anatomy, physiology and investigations
_ Major manifestations of renal and urinary tract disease
_ Dysuria, pyuria, urethral symptoms
_ Disorders of urine volume
_ Hamaturia
_ Proteinuria
_ Oedema
_ Obstruction of the urinary tract
_ Incontinence
_ Acute and chronic renal failure
_ Infections of the kidney and urinary tract
_ Congenital abnormalities of the kidneys and urinary system
_ Glomerulonephritides
_ Tubulo-interstitial diseases
_ Renal involvement in systemic disorders
_ Drugs and the kidney
_ Renal vascular diseases
_ Urinary tract calculi and nephrocalcinosis

_ Tumors of the kidney and genitourinary tract
_ Renal replacement therapy

Gastrointestinal tract
_ Clinical examination of the abdomen
_ Functional anatomy, physiology and investigations particularly role of imaging, endoscopy and tests of function
_ Major manifestations of gastrointestinal disease
_ Abdominal pain (acute and chronic)
_ Dysphagia
_ Dyspepsia
_ Vomiting
_ Constipation
_ Diarrhoea
_ Abdominal lump
_ Weight loss
_ Gastrointestinal bleeding - upper and lower
_ Approach to the patient with gastrointestinal disease
_ Diseases of the mouth and salivary glands - oral ulcers, candidiasis, parotitis
_ Diseases of the oesophagus - GERD, other motility disorders, oesophagitis, carcinoma oesophagus
_ Diseases of the stomach and duodenum - gastritis, peptic ulcer disease, tumors of stomach
_ Diseases of the small intestine
_ Acute gastroenteritis & food poisoning
_ Intestinal tuberculosis
_ Inflammatory bowel disease
_ Malabsorption syndrome
_ Tumors of small intestine
_ Acute, sub-acute and chronic intestinal obstruction
_ Disorders of the colon and rectum
_ Bacillary dysentery
_ Amoebic colitis
_ Ulcerative colitis
_ Tumors of the colon & rectum
_ Irritable bowel disease
_ Abdominal tuberculosis
- Peritoneal
- Nodal
- Gastrointestinal
_ Ischaemic gut injury
_ Anorectal disorders
_ Diseases of the peritoneal cavity
_ Acute and chronic peritonitis
_ Ascites
_ Peritoneal carcinomatotis

Diseases of the pancreas
_ Acute and chronic pancreatitis
_ Tumors of pancreas

Liver and Biliary tract disease
_ Clinical examination of the abdomen for liver and biliary disease

_ Functional anatomy, physiology and investigations of hepatobiliary disease
_ Major manifestations of liver disease
_ 'Asymptomatic' abnormal liver function tests
_ Jaundice
_ Acute (fulminant) hepatic failure
_ Portal hypertension and ascites
_ Hepatic (portosystemic) encephalopathy
_ Hepatorenal failure
_ Liver abscess - amoebic & pyogenic
_ Viral hepatitis - acute and chronic
_ Alcoholic liver disease
_ Cirrhosis of liver and chronic liver disease
_ Drugs, toxins and liver
_ Fatty liver and non alcoholic steatohepatitis
_ Infiltrative diseases of liver
_ Wilson's disease
_ Hemachromatosis
_ Tumors of the liver
_ Gallbladder and biliary tract diseases
_ Functional anatomy
_ Acute and chronic 'cholecystitis'
_ Cholelithiasis
_ Tumors of gall bladder and bile ducts

Endocrinology and Metabolism
Diabetes mellitus
Disorders of the Thyroid gland
Disorders of The reproductive system
Disorder of The parathyroid glands
Disorder of The adrenal glands, hypothalamus and the pituitary gland
Hematological disorders
_ Clinical examination in blood disorders
_ Functional anatomy, physiology and investigations
_ Major manifestations of hematological diseases
_ Anaemia
_ Polycythemia
_ Leucopenia
_ Leucocytosis
_ Thrombocytopenia
_ Thrombocytosis
_ Pancytopenia
_ Lymphadenopathy
_ Splenomegaly
_ Bleeding
_ Venous thrombosis
_ Abnormal coagulation screen
_ Infections
_ Anemias
_ Myeloproliferative disorders
_ Haematological malignancies
_ Bleeding disorders
_ Disorders of coagulation and venous thrombosis

_ Blood products and transfusion
_ Bone marrow transplantation

Disorders of the immune system, connective tissue and joints

_ Introduction to the immune system and autoimmunity
_ Primary immune deficiency diseases
_ HIV, AIDS and related disorders
_ Major manifestations of musculoskeletal disease
_ Joint pains
_ Bone pain
_ Muscle pain and weakness
_ Regional periarticular pain
_ Back and neck pain
_ Approach to articular and musculoskeletal disorders
_ Inflammatory joint disease
_ Infectious arthritis
_ Inflammatory muscle disease
_ Osteoarthritis
_ Systemic connective tissue diseases - SLE, RA, PSS
_ Vasculitides
_ Ankylosing spondylitis, reactive arthritis and undifferentiated spondyloarthropathy
_ Sarcoidosis
_ Amyloidosis
_ Musculoskeletal manifestations of disease in other systems
_ Fibromyalgia
_ Diseases of bone

Neurological diseases
_ Clinical examination of nervous system
_ Functional anatomy, physiology and investigations
_ Major manifestations of nervous system disease
_ Headache and facial pain
_ Raised intracranial tension
_ Faintness, dizziness, syncope & vertigo
_ Sleep disorders
_ Disorders of movement
_ Ataxia
_ Sensory disturbances (numbness, tingling and sensory loss)
_ Acute confusional states
_ Coma and brain death
_ Aphasias and other focal cerebral disorders
_ Speech, swallowing and brain-stem disturbance
_ Visual disturbances
_ Sphincter disturbances
_ Migraine and cluster headaches
_ Seizures and epilepsy
_ Cerebrovascular disease
_ Dementias
_ Acute and chronic meningitis
_ Viral encephalitis
_ Diseases of cranial nerves

_ Intracranial tumours
_ Diseases of spinal cord
_ Multiple sclerosis and other demyelinating diseases
_ Parkinson's disease and other extrapyramidal disorders
_ Cerebellar disorders
_ Motor neuron disease
_ Peripheral neuropathy
_ Neurological manifestations of system diseases
_ Nutritional and metabolic diseases of the nervous system
_ Myasthenia gravis and other diseases of neuromuscular junction
_ Diseases of muscle

OBSTETRICS & GYNAECOLOGY
BASIC SCIENCES

1. Normal & abnormal development, structure and function of female & male urogenital systems and the female breast.
2. Applied anatomy of the genito-urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh (inguinal ligament, inguinal canal, vulva, rectum and anal canal).
3. Physiology of permatogenesis.
4. Endocrinology related to male and female reproduction.
5. Anatomy & Physiology of urinary & lower GI (Rectum / anal canal), tract.
6. Development, structure & function of placenta, umbilical cord & amniotic fluid.
7. Anatomical & physiological changes in female genital tract during pregnancy fistulae.
8. Anatomy of fetus, fetal growth & development, fetal physiology & fetal circulation.
9. Physiological & neuro-endocrinal changes during puberty disorders, adolescence, menstruation, ovulation, fertilization, climacteric & menopause.
10. Gametogenesis, fertilization, implantation & early development of embryo.
11. Normal pregnancy, physiological changes during pregnancy, labour & puerperium.
12. Immunology of pregnancy
13. Lactation
14. Biochemical and endocrine changes during pregnancy, including systemic changes in cardiovascular, hematological, renal, hepatic and other systems. (Anaemia)
15. Biophysical and biochemical changes in uterus and cervix during pregnancy & labour.
16. Pharmacology of identified drugs used during pregnancy, labour, post partum period with reference to their mechanism of action, absorption, distribution, excretion, metabolism, transfer of the drugs across the placenta, effect of the drugs on the fetus, their excretion through breast milk.
17. Mechanism of action, excretion, metabolism of identified drugs used in Gynaecology, including chemotherapeutic drugs.
18. Role of hormones in Obstetrics & Gynaecology.
19. Markers in Obstetric & Gynaecology – Non neoplastic and Neoplastic Diseases.
20. Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased conditions.
21. Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.
22. Normal and abnormal microbiology of the genital tract – bacterial, viral & parasitic infections responsible for maternal, fetal and gynaecological disorders.
23. Humoral and cellular immunology in Obstetrics & Gynaecology.

II OBSTETRICS

1. Physiology of normal pregnancy, diagnosis of pregnancy, routine antenatal care, management of common symptoms in pregnancy, investigations to be carried out in pregnancy;
2. Drugs prescription during pregnancy and lactation
3. Hypertensive disorders in pregnancy
4. Anaemia in Pregnancy : Heart disease in pregnancy
5. Antepartum haemorrhage Obstetrics & Gynaecology
6. Intrauterine Growth Restriction (IUGR)
7. Antenatal Fetal Surveillance
8. Rhesus Negative Pregnancy
9. Disorders of liver, kidneys in pregnancy
10. Multiple pregnancy
11. Puerperium, and its complications
12. Perinatal and maternal mortality in India

III GYNAECOLOGY

1. Anatomy of fetal genital tract, and its variations, supports of uterus, developmental anomalies of uterus.
2. Ectopic pregnancy; epidemiology, early diagnosis and management.
3. Physiology of menstruation, common menstrual problem.
4. Disorders of growth, amenorrhoeas
5. Fibroid uterus
6. Prolapse uterus
7. Vaginal discharge, sexually transmitted diseases
8. Precancerous lesions of female genital tract (cervix, vagina, vulva)
9. Carcinoma Cervix, epidemiology, staging diagnostic procedure, treatment.
10. Carcinoma Endometrium
11. Carcinoma ovary
12. Carcinoma vulva
13. Gestational Trophoblastic disease
14. Temporary and permanent methods of contraception
15. Menopause and related problems
16. Endometriosis
17. Genital Tract Fistulae
18. Adolescence, Pubertal changes, disorders of puberty

IV Contraception, Neonatology and Recent Advances

(a) Contraception (Male & Female)
(b) Medical terminal of pregnancy – safe abortion – selection of cases, technique & management of complication of medical and surgical procedures, MTP law Medical abortion & Emergency Contraception.
(c) Care of new born, neonatal resuscitation, detection of neonatal malformation.
(d) Neonatal sepsis – prevention, detection & management.
(e) Neonatal hyper-bilirubinemia – investigation & management including NICU care.
(f) Management of common neonatal problems

PEDIATRICS

Vital statistics
Growth and development

Nutrition
Immunization
Infectious diseases
Hematology
Respiratory system
Gastro Intestinal Tract

- Clinical approach to a child with jaundice, vomiting, abdominal pain, upper and lower GI bleeding, hepato-splenomegaly.
- Acute diarrheal disease-Etiopathogenesis, Clinical differentiation of watery and invasive diarrhea, complications of diarrheal illness. Assessment f dehydration, treatment at home and in hospital.
  Fluid and electrolyte management. Oral rehydration, composition of ORS.
- Persistent and chronic diarrhea
- Clinical features and management of acute viral hepatitis and acute liver failure, Causes & diagnosis of Chronic Liver Disease.
- Neonatal cholestasis, portal hypertension
- Common causes of constipation.
- Abdominal tuberculosis.
- Causes, clinical features and management of Portal hypertension, Reye's syndrome, Celiac disease.
- Drug induced hepatitis Central Nervous System
- Evaluation of milestones and developmental age· Localization of neurological deficit· Clinical approach to a child with coma, mental retardation· Common causes and approach to convulsion· Clinical diagnosis, investigations and treatment of acute pyogenic meningitis, encephalitis & Tubercular Meningitis, Cerebral Malaria· Seizure Disorder-Causes and types of convulsions at different ages. Diagnosis categorization &management of Epilepsy (Broad outline). Febrile convulsions-definition, types Management of seizures and status epilepticus. Causes, diagnosis and management of cerebral palsy. Acute flaccid paralysis – Differentiation between Polio and Guillain – Barre syndrome. Microcephaly, Hydrocephalus, chorea. Counseling parents for inherited neurological diseases. Infantile tremor syndrome, infantile hemiplegia

Cardiovascular system

- Clinical features, diagnosis, investigation, treatment and prevention of acute rheumatic fever. Common forms of rheumatic heart disease in childhood. Differentiation between rheumatic and rheumatoidarthritis. Recognition of congenital acyanotic and cyanotic heart disease. Hemodynamics, clinical features and management of VSD, PDA, ASD and Fallot's tetralogy (Cyanotic spells). Recognition of congestive cardiac failure in children. Hypertension in children-recognition and referral. Diagnosis and management of bacterial endocarditis, pericardial effusion, myocarditis.

Genito-Urinary system

- Basic etiopathogenesis, clinical features, diagnosis, complications and management of acute poststreptococcal glomerulo-nephritis and nephrotic syndrome. Etiology, clinical feature, diagnosis and management of urinary tract infection – acute and recurrent. Etiology, diagnosis and principles of management of acute failure. Causes and diagnosis of obstructive uropathy in children. Diagnosis and principles of management of chronic renal failure. Causes and diagnosis of hematuria. Renal and bladder stones. Hemolyticuremic syndrome

Endocrinology

- Etiology clinical features & diagnosis of diabetes and hypothyroidism, hyperthyroidism and goiter in children. Delayed and precocious puberty

Neonatology

- Definition – live birth, neonatal period, classification according to weight and gestation, mortalit rates. Delivery room management including neonatal resuscitation and temperature control. Etiology, clinical features, principles of management and prevention of birth asphyxia. Birth injuries – causes and their recognition. Care of the normal newborn in the first week of life. Normal variations and clinical signs in the neonate. Breast feeding-physiology and its clinical management. Identification of congenital anomalies at birth with special reference to anorectal anomalies, tracheoesophageal fistula, diaphragmatic hernias, neural tube defects. Neonatal Jaundice: causes, diagnosis and principles of management. Neonatal infection– etiology, diagnosis, principles of management. Superficial infections, sepsis. Low birth weight babies-causes of prematurity and small-for-date baby, clinical features and differentiation. Principles of feeding and temperature regulation. Problems of low birth weight babies. Identification of sick newborn (i.e. detection of abnormal signs – cyanosis, jaundice, respiratory distress, bleeding, seizures, refusal to feed, abdominal distension, failure to pass meconium and urine. Recognition and management of specific neonatal problemshypoglycemia, hypocalcemia, anemia, seizures, necrotizing enterocolitis, hemorrhage Common intra-uterine infections .Transportation of a sick neonate.

Pediatrics Emergencies

- Status epilepticus
- Status asthmaticus / Acute Severe Asthma
- Shock and anaphylaxis.
- Burns
- Hypertensive emergencies.
- Gastrointestinal bleed.
- Comatose child
- Congestive cardiac failure
- Acute renal failure

Fluid-Electrolyte

- Principles of fluid and electrolyte therapy in children
- Pathophysiology of acid-base imbalance and principle of management Genetics
- Principles of inheritance and diagnosis of genetic disorders
- Down's syndrome

Behavioral Problems

- Breath holding spells, nocturnal enuresis, temper tantrums, pica

Pediatrics Surgical Problems: Diagnosis and timing of surgery of Cleft lip/palate, hypospadias, undescended testis, tracheoesophageal fistula, hydrocephalus, CTEV, Umbilical and inguinal hernia, malformations, hypertrophic pyloric stenosis.

Therapeutics: Pediatric doses, drug combinations, drug interactions, age specific choice of antibiotics.

SURGERY & ALLIED SPECIALITIES

Pathogenesis, causes, epidemiology, Clinical Presentation, Investigations, and management of the diseases in the following systems:

1. Skin: ulcers and wounds, wound infections, burns, skin infections (boils, carbuncle, abcess), cysts (epidermoid cyst, dermoid),skin tumors(basal cell carcinoma, squamous cell carcinoma, melanoma).

2. Head and Neck region: congenital anomalies (cleft lip, cleft palate, branchial cyst and fistula, thyroglossal cyst) swellings of parotid and submandibular glands, oral ulcers, leukoplakia, submucous fibrosis, lichen planus, common jaw tumors, squamous carcinoma of oral cavity, pharynx & larynx.Thyroid swellings (adenomatous goitre, Graves' Disease, papillary and follicular thyroid cancer).Swellings of lymph nodes (tuberculosis, lymphoma, metastatic carcinoma)

3. Arteries: Features of limb Ischaemia, noninvasive vascular diagnostic tests, obliterative atheromatous disease, aneurysms, Raynaud's syndrome, arterial emboli.

4. Veins: varicose veins, deep vein thrombosis , pulmonary embolism.

5. Breast: mastalgia, ANDI, fibroadenoma, cyst, breast abscess, cancer of the breast.

6. Oesophagus: dysphagia, reflux, hiatus hernia, benign and malignant tumours.

7. Stomach and duodenum: Peptic ulcer- stomach and duodenum, carcinoma of the stomach, gastritis.

8. Small intestine: Small bowel obstruction, intestinal tuberculosis.

9. Colon and rectum: Amoebic colitis, Ulcerative colitis, colorectal cancer.

10. Appendix: Acute appendicitis.

11. Anus: Haemorrhoids, Pruritus ani, Fissure-in-ano, Anorectal abscesses, Fistula-in-ano, cancer of the anus.

12. Peritoneum and intraperitoneal abscesses: peritonitis.

13. Liver: Hepatic trauma, abscesses, cancer.

14. Biliary tract: gall stone disease, carcinoma of the gallbladder.

15. Pancreas: Acute panacreatitis, pancreatic cancer.

16. Acute abdomen

17. Hernias of the abdominal wall: Inguinal hernias, femoral hernia, umbilical and epigastric hernia.

18. Urology: Diagnostic studies and techniques in the urinary tract, trauma to the urinary tract, urinary calculi, urinary tract infection, prostatic hyperplasia, tumours of the kidney, epididymo-orchitis, hydrocele, tumours of the testicle, carcinoma of the penis.

ORTHOPAEDICS

Fracture:Definition, Classification, Principles of Management

- Fracture healing, delayed union. Classification & Management of open fractures
- Management of fracture calvicle, dislocation shoulder & fracture shaft humerus
- Classificaton of injuries around elbow & management of
- supracondylar fracture & dislocation of elbow
- Monteggia fracture dislocation & fracture both bones of forearm
- Volkamann's Ischaemic Contracture
- Fracture of lower end of radius fracture scaphoid and metacarpals
- Fracture pelvis & dislocation of hip
- Fracture neck of femur
- Fracture shaft of femur & tibia
- Internal Derangements of Knee, Injuries of ankle & foot
- Amputations
- Congenital malformations: CTEV Torticollis
- Congenital Malformation : CDH, Pseudoarthrosis tibia etc.
- Disorders of the hip : coxa vara, perthes diseases
- Deformities of the spine
- Acute Pyogenic Ostyeomyelitis
- Chronic Pyogenic Osteomyelities
- Septic Arthritis
- Other Arthritides (Rheumatoid/Ank.Spond.)
- Osteo-articular tuberculosis:
- General consideration & principles of management
- Tuberculosis: Spine
- Poliomyelitis
- Bone Tumours: Benign tumors
- Bone Tumours: Malignant tumors

OTORHINOLARYNGOLOGY

Nose: Deviated nasal septus, nasal polypi, angiofibroma. Tumours both benign and malignant, chronic granulomatous disease? Nose like rhinospondiosis and atrophic rhinitis.

Oral cavity and oropharynx

Tonsillitis, leukoplakia, carcinoma apthocu ulcers, pharyngitis, peritonsilla abscess, candidiasis.

Ear

Perichondritis, coax, otitis externa, secretary, otitis media, acute suppuratin otitis media, chronic supputatin otitis media (safe and unsafe), benign and malignant tumors of ear, larynx, vocal cord nodule, vocal polyp, carcinoma, vocal cord palsy.

Hypopharynx : Benign and malignant disease.

Neck : Lymphadenitis, metastatic neck benign and malignant tumors of neck, broncheal sinus, branchially pyroid tumors, salvary gland tumors.

Emergencies : Respiratory obstruction foreign bodies in nose, ear, throat, trachobroncheal tree and esophagus nasal bleeding, trauma to neck.

OPHTHALMOLOGY

- Microbiology in relation to eye
- Pathology in relation to eye
- Pharmacology in relation to eye
- Symptomatology in Ocular disorders and their Pathogenesis
- Ocular involvement in systemic diseases
- Disorders of the Lid
- Disorders of the Lacrimal Apparatus
- Conjunctivitis & Ophthalmia Neonatorum
- Trachoma & Other chronic conjunctivitis
- Keratitis and corneal ulcers
- Corneal ulcer
- Scleritis & Episcleritis
- Refractive Errors & Method of correction
- Presbyopia, accommodation convergence
- Congenitial cataract
- Senile cataract
- Metabolic & complicated cataract
- Primary Angle closure glaucoma
- Congenitial glaucoma
- Primary Open angle glaucoma
- Secodary glaucomas
- Anterior uveitis
- Posterior uveitis
- Blindness prevalence, prevention & rehabilitation
- Retinopathies, Hypertensive, Toxaemia & Pregnancy
- Diabetic Retinopathy
- Retinal Detachment, types, symptoms & pre-disposing factors
- Endocrine ophthalmology
- Retinal vascular disorders
- Retinoblastoma & other ocular neoplasms
- Binocular vision amblyopia & concomitant squint
- Nutritional disorders
- Incomitant strabismus
- Visual acuity, pupillary path ways & cranial nerve palsies
- Optic nerve lesions
- Ocular emergencies (Traumatic)
- Ocular emergencies (Non-Traumatic)
- Minor ophthalmic surgery
- General principles of Intra ocular surgery
- National programme for control of blindness
- Comprehensive eye care in rural set up
- Eye banking & ethics in ophthalmology

PHILOSOPHY

PAPER-I

Problems of Philosophy – A

Section – I: Indian Philosophy:

1. Carvaka: Theory of Knowledge. 2. Jainism: Theory of Reality, Saptabhanginaya Bondage and Liberation. 3. Buddhism: Pratityasamutpada, Ksanikavada, Nairatmyavada. 4. Samkhya: Prakrit, Purusa, Theory of Causation, Liberation. 5. Nyaya-Vaiesesika: Theory of Pramana, Self, Liberation, God and Proofs for God's Existence, Categories, Theory of Causation. 6. Mimamsa: Theory of Knowledge. 7. Vedanta: Schools of Vedanta, Sankara, Ramaunja, (Brahman, Isvara, Atman, Jiva, Jagat, Maya, Avida, Adhyasa, Moksa).

Section II: Western Philosophy:

1. Plato: Theory of Ideas. 2. Aristotle: Form, Matter and Causation. 3. Descartes: Cartesian Method and certain knowledge, God, Mind-Body Dualism. 4. Spinoza: Substance. 5. Leibniz: Monads; 6. Locke: theory of knowledge, Rejection of Innate Ideas. 7. Berkeley: Essest Percipii. Hume: Scepticism, Causality. 8. Kant: Distinctions between synthetic and analytic judgments and between a priori and a posteriori judgments, Possibility of Synthetic a priori judgments, Criticism of the Proofs for the Existence of God. 9. Hegel: Dialectical Method, Absolute Idealism. 10. Moore: Defence of common sense, Refutation of idealism, 11. Russell: Logical Atomism: Atomic Facts, Atomic sentences, Logical Constructions and Incomplete Symbols. 12. Logical Positivism: Verification theory and rejection of Metaphysics, (A.J. Ayer). 13. Hussere: Phenomenology: 14. Existentialism: Kierkegaard, Sartre. 15. Strawson: Theory of person.

Section III: Logic (Indian):

Unit-1: Definition and constituents of Anumana in Nyaya and Buddhism; nature of Vyapti in Nyaya.

Unit-II: Inductive elements in Indian Logic: the concepts of vyaptigrahopaya, samanya laksana pratyasatti, tarka, upadhi-nirasa.

Section IV: Logic (Western):

Unit-I: Categorical Syllogism, Basic rules determining validity of syllogism and fallacies - arising as a result of the violation of those rules; immediate inferences: Conversion, obversion and contraposition.

Unit-II: Elementary notions and principles of truth-functional logic; techniques of symbolization; testing validity/ Invalidity of an argument form by truth-table method; proof construction for the validity of an argument form; statement—forms: tautologous, contradictory, and contingent.

Section-V: Contemporary Indian Philosophy:

(i) Swami Vivekananda: Man, Universal Religion.
(ii) Mahatma Gandhi: Satyagraha, Sarvodaya, Non-violence.
(iii) S. Radha Krishnan: God and Absolute: Intellect and Intuition.

PAPER-II
Problems of Philosophy-B

Section-I: Ethics (Indian):

Unit-I: A. The law of karma: ethical implications, Brahmaviharas.
B. Sadharana dharma, Triratnas of Jainism.

Unit-II: A. Concept of Rna, Varna dharma and asrama-dharma, Yama and Niyama of Yoga.
B. Gita's notion of Svadharma and Lokasangraha; Karma Yoga, Bhakti Yoga and Jnana Yoga.

Section-II: Ethics (Western):

Unit-I: A. Nature and Scope of ethics; concepts of right, good and duty.
B. Presuppositions of Morality; Freedom, Determinism and Responsibility.

Unit-II: A. Theories of Punishment: Deterrent, retributive and reformative theories; theories of relation between individual and society.
B. Normative ethics; Brief outlines of the Ethical Theories of Aristotle, J. Bentham, and J.S. Mill.

Section-III: Philosophy of Religion :

Unit-I: Nature & scope of Philosophy of Religion and its relation with Theology.

Unit-II: Approaches to the study of Religion: Historical, Sociological and Psychological.

Unit-III: Foundation of religious belief: Revelation, Faith and Mysticism.

Unit-IV: Different Theories about God : Deism, Theism and Pentheism.

Unit-V: Immorality of Soul: Proofs. Disproofs. Kinds.

Section-IV: Socio-Political Philosophy :

1. Political Ideals: Equality, Justice, Liberty. 2. Sovereignty (Austin, Laski, Kautilya) 3. Individual and State. 4. Democracy; Concept and forms. 5. Socialism and Marxism. 6. Humanism. 7. Secularism. 8. Gender-Equality. 9. Scientific Temper and Progress. 10. Philosophy of Ecology.

Section-V: Contemporary Western Philosophy :

Unit-I: Issues and problems: sense and reference (G. Frege); definite descriptions (B. Russell).

Unit-II: Theories of meaning; (L. Wittgenstein and J.L. Austin).

PHYSICS
PAPER-I

Note: There will be five sections in the question paper. From each section two questions will be asked. Each question will have two parts .Candidate will be required to answer one question form each section.

1. MECHANICS: Newton's laws of motion, symmetries & conservation laws. Motion of rigid bodies: Coriolis force, Kepler's laws of planetary motion, artificial satellites and their types equation of motion under central force, equation or orbit and turning point. Relativistic mechanics: Michelson Morley experiment, Galilean Transformation, Relativity of mass, length and time, relativistic momentum, velocity addition & Doppler effect, mass-energy equivalence. Fluid motion, Bernoullie's theorem Circulation, Reynold's number. Turbulence, viscosity, Surface tension. Elastic and inelastic collision in laboratory and centre of mass coordinate systems, Rutherford scattering.

2. THERMAL AND STATISTICAL PHYSICS: Perfect gas. Vander Waal's equation. Laws of thermodynamics and their applications: Carnot's cycle, carnot's heat engine, refrigerators and heat pumps, Entropy and its significance. Production and measurements of low temperatures. Statistical Physics: Phase space, microstates and macrostates. Boltzmann's law of entropy. Fermi Dirac and Bose.-Einstein distribution laws. Black body radiations, Thermal ionization. Elements of irreversible thermodynamics. Solar energy and its utilization as alternative source of energy.

3. WAVES AND OSCILLATIONS: Simple and damped Harmonic motion & its characteristics. Composition of two of S.H.M's. Lissajous figures, Oscillations with one and two degrees of freedom, forced vibrations, resonance. Wave motion, phase and group velocity. Coupled oscillators, standing waves on a string of fixed length, energy of a vibrating string.

4. PHYSICAL OPTICS: Huygen's Principle, reflection and refraction on the basis wave theory, Interference: Young's double slit experiment, Fresnel biprism, diffraction: Fraunhofer diffraction at single slit, double slit, diffraction grating and its resolving and dispersive power. Polarization of waves: Brewsters laws, double refraction, half wave and quarter wave plates. Multiple beam interference Geometrical Optics E.M. Wave equation, Fresnel's formula. Normal and anomalous dispersion Optical instruments and their magnification & resolving power.

5. LASERS: Laser principle, spontaneous & stimulated emission, population inversion, three & four level schemes of laser action, characteristics and applications of Lasers, He- Ne, ruby and semiconductor lasers. Pulsed lasers and tunable lasers, spatial coherence and directionality, estimate of beam intensity. Fibre optics and optical fibre communication.

PAPER-II

Note: There will be five sections in the question paper. From each section two questions will be asked. Each question will have two parts. Candidate will be required to answer one question form each section.

1. ELECTRICITY, MAGNETISTM**:** Gauss Law, Kirchoff's laws and their applications, Poisson's and Laplace's equations and their simple applications, Dielectric and Polarization. Capacitors. Dia para and ferro magnetic materials. Biot & Savarts Law, Ampere's law and their applications. Faraday's laws of electromagnetic induction self and mutual induction. Alternating currents, LCR circuits, concept of displacement current, Maxwell's equations (differentials and integral form both), Electromagnetic wave equations.

2. QUANTUM MECHANICS & ATOMIC PHYSICS: Wave particle duality, Davisson-Germer experiment, uncertainty principle and its applications, postulates of quantum mechanics, operators in quantum mechanics. Schrodinger wave equation and its simple applications: particle in box, harmonic oscillator, infinite potential barrier and finite

potential barrier tunnel effect, hydrogen atom as a central force system Bohr's theory, Electron spin, Lande's g factor, Pauli's principle. Zeeman effect. Stark effect. Stern Garlach experiments, Frank Hertz experiment. Photoelectric effect. Elements of X-Ray spectra. Compton scattering. Molecular spectra, spectrum of many electron systems, Raman effect and its experimental observation, continuous, line and band spectra.

3. NUCLEAR AND PARTICLE PHYSICS: Basic properties: Size, Shape, charge distributions binding energy, semi empirical mass formula, Nuclear forces, Liquid drop model & shell model, radio activity, mechanism and decay, properties of neutrons, nuclear fission and reactors, nuclear fusion, stellar energy, cosmic ray showers. Pair production. Particle accelerators and detection, Simple properties of elementary particles, symmetry in physical laws. Concept of quarks, Unification of fundamental forces (elementary ideas).

4. SOLID STATE PHYSICS AND ELECTRONICS**:** Fundamentals crystal structure, Bragg's law experimental arrangements, lave pattern, lane equation, atomic scattering factor, geometrical structure factor, crystal bonding, vibrations of one dimensional monatomic chain, concept of phonons, Einstein and Debye's Model of specific of solids. Free electron gas model of methods Kroning Penny model, Brillounin zones, energy bands, effective mass, Semiconductors and their types, Band structure of metals and semi conductors.

5. ELECTRONICS: Doped semiconductors, p-n diode, its characteristics and applications, rectification, transistors characteristics and application as amplifier, oscillator, BJT, FET'S and MOSFETS, Digital MOSFET Circuits, Digital electronics: Boolean Algebra basics and combinational logic gates truth tables, de- Morgan's theorems. Basic idea of modulation and detection of r.f. wave. Fundamentals of microprocessors and digital computers (elementary ideas).

POLITICAL SCIENCE
PAPER-I
PART –A

Political Theory:

1. The State: Theories of Origin of the State: Historical or Evolutionary Theory, Social Contract Theory, Marxist Theory.
2. Theories of Function of States: Liberal-welfare Theory, Marxist Theory.
3. The Concept of Sovereignty: Monistic and Pluralistic Views.
4. Key Concepts: Rights, Property, Liberty, Equality, Justice and Law.
5. Political Theories: Liberalism, Socialism, Fascism, Marxism and Anarchism.
6. Concept of Government Forms of Government, Parliamentary and Presidential System, Unicameralism and Bicameralism, Federal and Unitary System, Theory of Separation of Powers, Electoral System.
7. Power, Legitimacy and Authority.

PART-B

1. The Nature and Impact of British Colonial Rule in India.
2. Indian National Movement and Political Development Since from 1885.
   (The Emphasis on this Section will be on a Thorough Knowledge of Forces and Ideas that led to Institutional changes. There will be no Specific Question on Acts)
3. Indian System of Government:
   (a) Executive (President, Prime Minister, Cabinet).
   (b) Legislature and Judiciary.

(c) State Government Structure: The Interaction among Executive, Legislature and Judicial Institutions at Union and State Level.
(d) Federal Structure and Dynamics: State of Federal Polity Today.
(e) Role of Bureaucracy in Socio-Economic Development.
(f) Civil Liberties, Human Rights.
(g) Fundamental Rights, Directive Principles of State Policy.
(h) Amending Process.
(i) Political Parties: Their Ideology, Social Base and Political Performance.
(j) Pressure Groups in India.
(k) Role of Caste in Indian Politics, Communalism, Regionalism, Regional Imbalances and Regional Movements

Note: Emphasis will be on the Study of Institutional Structure and their actual Working.

PAPER-II
PART-A

1. Decolonisation, Emergence of New Nations and Its Implications on nature of International Relations.
2. Cold War –Origin, Development, Détente, Post-Cold War World Order with Special Reference to the Disintegration of the U.S.S.R.
3. Concept of Non-alignment –Development of Non-alignment Movement, Political and Economic Dimension of Non-alignment Movement, Changing Character of Nonalignment Movement in the Context of Post-Cold War Era.
4. New International Economic Order: Globalisation, W.T.O., North-South Dialogue, South-South Cooperation.
5. U.N.O: It's role in the Developing International Order.

PART-B

1. Government and Politics of U.K., U.S.A., China & Switzerland.

Note: "Candidates are required to have the Knowledge of the actual Working of Executive, Legislature, Judiciary, Political Parties and Pressure Groups of the countries Mentioned Above".

PSYCHOLOGY
PAPER-I

1. Science and Psychological Research:

   Assumptions of science, characteristics of scientific method; Theory and facts. Nature of psychological research. Correlational and experimental.

2. Hypothesis Testing and making Inferences:

   Population and sample, Random sampling, sampling distribution, standard errors of mean, SD and r; df ; Nature and assumptions of t and ANOVA, level of significance; Type I and Type II errors in inference making. Non-parametric Test. Application of statistical techniques (t-test, one-way ANOVA, correlation, chi-square, sign test and Fried man test).

3. Methods of Psychology:

   Characteristics and components of methods in psychology (induction, deduction, introspection). Observation, survey, laboratory and field experiments, clinical and case study. Experimental and quasi experimental methods.

4. Construction and standardization of test:

Theory and procedure, Item analysis, Reliability, Validity. Development of norms and interpreting test scores cross validation.

5. Human Development:

Concept and theories of human development; methods of Study; Biological, cultural and social factors in human Development; Socialization: Role of family, peer, school and Media.

6. Attention and perception:

Selective attention and its theories. Factors influencing attention (set and characteristics of Stimulus). Sensation: Concept of threshold, absolute and Difference thresholds, signal detection and vigilance. Definition and concept of perception, biological factors in perception. Perceptual organization factors influencing space and depth perception, size estimation and readiness.

7. Learning:

Concept and theories of learning (Pavlov, Skinner and Piaget). The process of extinction, spontaneous recovery, generalization And discrimination programmed learning, self instructional Learning concepts, types and schedules of reinforcement. Modelling and social learning.

8. Memory and forgetting:

Concept and definition of memory and forgetting, encoding, Storage and retrieval processes. Short term and long term memories. Factors influencing retention and forgetting. Theories of forgetting (Repression, Decay and interference theories). The concept of reminiscence.

Section-B

9. Thinking and problem solving:

Processes of concept formation. Reasoning and problem solving. Nature and measurement of creativity, factors affecting creativity and creative thinking. Information processing. Decision making and judgement.

10. Intelligence and aptitude:

Concept and definition of intelligence and aptitude. Nature and theories of intelligence. Measurement of intelligence and aptitude. Concept and measurement of emotional and multiple intelligence.

11. Motivation and emotion:

Definition and concepts of instincts, needs, drives and motives. Theories of motivation and their applications (drive reduction theory, Maslows motivational hierarchy). Social motivation: Achievement, power affiliation motives. Assessment of motivation.

Emotions: Definition and concept, theories, physiological correlates. Development expression measurement and control. Emotional Disorders: Stress and other causes of emotional disorders; Neurotic and psychotic disorders.

12. Personality:

Concept and definition. Theories of personality (Psychoanalytical, socio cultural, interpersonal and developmental, humanistic, behaviouristic trait and type approaches). Techniques of assessment (Psychometric and projective). MMPI, EPI, TAT, PF and Roschach. Indian approaches to personality. Training for personality development.

13. Attitudes, Values and interests:

Definitions, concepts & components of attitudes, values and interests. Nature and function of attitudes, attitude and behaviour. Theories of reasoned and planned behaviour. Formation, change and measurement of attitudes. Attitude changes and strategies for stering values.

14. Communication:

Communication models: Verbal and non verbal communication. Language and social interaction. Process and type of communication. Barriers in communication. Effective communication Interpersonal attraction and communication.

15. Recent Trends:

Computer application in psychological laboratory and psychological testing. Artificial intelligence, computer phobia, studies of dreams, meditation, hypnotic and drug induced states. Extrasensory perception, Intersensory perception.

PAPER-II
Issues and Applications
Section-A

1. Psychological Assessment:

Nature and scope of human assessments. Principles of psychological test construction (Item analysis, Reliability, validity and development of norms). Types of psychological test (Group, performance & verbal). Assessment of general ability and special abilities (aptitudes) assessment personality (projective and non-projective tests). Limitations of psychological tests, ethical issues in the use of psychological tests.

2. Psychology of Health:

Nature, scope and development of health psychology. Concept of health, positive health, well being, happiness and ill health. Psychological disorders (Anxiety disorders, Mood disorders, Schizophrenia and delusional disorders, personality disorders and disorders due to psychoactive substance use, stress disorders). Casual factors of psychological disorders. Factors influencing positive health, well being, life style and quality of life.

3. Approaches to treatment and therapy:

Psychodynamic therapies, Behaviour therapies, Cognitive Therapies, Humanistic and existential therapy, Indigenous therapies (yoga, Reiki, Meditation), Biofeedback therapy. Prevention and rehabilitation of mentally ill.

4. Organizational Behaviour:

Perspective for understanding OB: open system approach, Human relations perspective, Socio-technical approach. Person in the organization: Personality definitions and measurement, concept of skill, self awareness; Matching personality and job. Theories of motivation, leadership and power, conflict negotiation and managing stress.

5. Application of psychology to educational field:

Principles undertaking effective teaching- learning process, gifted, retarded, learning disabled and their training. Training for improving memory and academic achievement. Personality development and value education. Educational, vocational, guidance and career counselling. Use of psychological tests in educational institutions.

6. Community Psychology:

Definition and concept of community psychology. Role of community psychologists in social change. Use of small groups in social action: Arousing community consciousness and actions for handling social problems. Group decision making and leadership for social change.

7. Rehabilitation Psychology:

Role of psychologist in primary, secondary and tertiary prevention programmes. Organising of services for rehabilitation of physically, mentally and socially challenged persons, including elderly. Rehabilitation of persons suffering from substance abuse, juvenile delinquency, criminal behaviours. Rehabilitation of victims of violence and HIV/AIDs victims.

Section B

8. Psychology and social inequality poverty and deprivation:

Social psychology and social issues. Increasing role of social psychology in social problems. Social psychological analysis of deprivation; consequences of deprivation; poverty-theories of poverty, Concomitants of poverty; inequality; sources of deprivation; Inequality and political mobilization, Social justification, Social interventions to remove injustice.

9. Psychological strategies for social integration:

The concept of social integration. The problem of caste, class, power, religion and language. Conflicts and prejudice. Nature and components of prejudice. Acquisition of prejudice and reduction of prejudices.

10. Application of psychology in Information Technology and Communication Technology:

The present scenario of information technology and the communication technology boom and the role of psychologists Selection and training of psychology professionals to work in the field of IT and Communication Technology, Distance learning through IT and Communication Technology. E-Commerce and multilevel marketing. Impact of TV and Computers Psychological consequence of recent developments of IT and Computers.

11. Application of psychology in the field of defence:

The concepts of Military psychology, Aviation psychology and psychological warfare. Role of psychologists in defence selection, recruitment and training of personnel. Role of counselling in facilitating the adjustment of personnel to military life. Psychological disorders due to war. Human engineering in defence. Psychological tests for defence personnel.

12. Application of psychology for Peace and Non-violence:

Concept of peace and non-violence, factors influencing peace, non-violence and aggression, obstacles to peace, Peace through coercive power, non-violence, world order, personal and community transformation. Conflict resolution through communication, negotiation and arbitration. Processes and skills in healing stress & trauma in post conflict society skill development in international negotiation.

13. Psychology and Economic development:

Achievement motivation and economic development Characteristics of entrepreneurial behaviour. Motivating and training people for entrepreneurship and economic development. Women entrepreneurs. Consumer rights and consumer courts.

14. Application of psychology to environment:

Effect of noise, pollution and atmospheric conditions, density and crowding on behaviour. Effect of perception, preferences and awareness of environment on environment. Nature and consequences of environment deprivation. Socio-psychological dimensions of environmental impact. Creating environmental awareness. Social movements (Chipko, Tehri, Narmada). Naturalistic observation and field surveys.

15. Other applications of psychology:

Sports psychology- improving performance of sports personnel, political behaviour, voting behaviour, development of ideology and use of social groups in politics, understanding of corruption, bribery and other forms of Anti social behaviours, strategies to deal with terrorism and violence, concept of social justice and injustice. Social interventions to remove injustice. Issues of human and social development and quality of life and development.

PUBLIC ADMINISTRATION
PAPER-I

Administrative Theory
Introduction:

1. Meaning, Scope and Significance of Public Administration. Evolution of Pubic Administration and its present status. Public Administration as an Art, Science or Craft. Approaches to the study of Public Administration i.e. Behavioural, Structural Functional Mechanical, Historical, Legal and Post Behavioural. Comparative Public Administration: Meaning, nature and scope.

2. Theories of Organization:- Scientific management (F. W. Taylorand the Scientific Management Movement). Classical Theory (Henry Fayol, Urwick & Gullick), Bureaucratic Theory (Max Weber) Human Relations Theory (Elton Mayo and others).

3. Principles of Organization: Hierarchy, Unity of Command span of control, Authority and Responsibility, Coordination, Supervision, Centralization and Decentralization, Delegation.

4. Structure of Public Organizations: Chief Executive, Topologies of Chief Executive and their functions. Forms of Public 'Organizations: Ministries and Departments, Corporations, Companies, Boards and commission. Line, Staff and Auxiliary Agencies.

5. Administrative Behaviour: Decision Making with special reference to Herbert Simon. Theories of Leadership. Communication, Morale, Motivation (Maslow and Herzberg). Behavioural Approach (Chester Bernard).

6. Public Policy:- Relevance of Public Policy Making in Public Administration. Process of Policy making and its implementation. Models of Policy making.

7. Accountability and control: Concepts of accountability and control. Legislative, Executive and judicial control over Administration. Citizen and Administration. People participation. Administrative corruption, Redressal of citizens grievance, Lokpal & Lokyakutas.

8. Administrative Law: Meaning, Significance and growth of administrative law. Delegated legislation, Rule of Law, Liability of Administration in Contracts and Torts. Administrative Discretion and judicial control. Principles of Natural Justice, Judicial review of Administrative action.

9. Personnel Administrative: Objectives of personnel administration. Importance of Human Resource Development. Recruitment, training and career development, Performance Appraisal, Promotions. Discipline, Employer-employee relations. Integrity and code of conduct. Grievance redressal mechanism. Neutrality and Anonymity.

10. Financial Administration: Concept of Budget, preparation and Execution of Budget. Control over public Expenditure. Performance budgeting, Resource mobilization: Tax and non-tax sources. Accounts and Audit.

11. Administrative Reforms: Meaning, process and obstacles. Techniques of administrative improvement: O & M, work study, work measurement. Role of Information Technology in administrative improvement E-Governance.

12. Comparative and Development Administration: Meaning nature and scope of Comparative public administration. Models of Comparative Public Administration: Bureaucratic and Ecological (contribution of Fred Riggs). The concept, scope and significance of development Administration, Political, Socio-cultural context development administration. Concept of sustainable development and concept of Good Governance.

PAPER-II

Indian Administration

1. Evolution of Indian Administration:- Kautilya, Mugal Period, British and Modern Periods.

2. Constitutional frame work:- Parliamentary Democracy, Federalism, Socialism, Secularism. Human Rights and National Human Rights Commission.

3. Structure of Union Government and Administration:- President, Prime Minister, Council of Ministers, Cabinet Committees. Cabinet Secretariat, Prime Ministers Office, Central Secretariat, Ministries and Departments Boards and Commissions, Field Organizations.

4. Centre-State Relations:- Legislative, Administrative and Financial Relations.

5. Law and Order administration:- Role of Central and State agencies in Maintenance of Law and order.

6. Public Enterprises:- Types of Public Enterprises, Contribution of Public Sector to the Indian economy. Management of Public enterprises in India:- Composition, powers, functions and types of Board of Public Enterprises. Accountability and control of public enterprises:- Parliamentary, Ministerial and Audit Controls. Changing role of the public sector in the context of liberalization.

7. Control of Public Expenditure:- Parliamentary Control Role of Finance Ministry, Comptroller and Auditor General.

8. Public Services: All India Services, constitutional position. Role and Functions of all India services. Union Public Services Commission. State services and the state public service commissions. Training of All India services. Constitutional protection available to civil services.

9. Administrative Reforms:- Reforms since independence since independence. Reports of Administrative Reforms Commissions Problems of Implementation

10. Machinery for Planning:- Role, composition and review of functions of the planning commission. Role of National Development Council. Process of plan formulation at Union and state levels. Decentralized planning.

11. Welfare Administration:- Administration for the welfare of weaker sections with special reference to SC's STs Women and children.

12. Major issues in Indian Administration:- Relationship between political and permanent executives, integrity in administration. Values in public service and administrative culture. Development and environmental issues. Right to information.

13. Local Government:- Panchayati Raj and Urban Local Government. Structure, functions and Finances of Local bodies. Main features of 73rd & 74th constitutional Amendments. Major rural and urban development programmes and their management.

14. District Administration:- Role and importance of district administration. Changing Role of District Collector/Deputy Commissioner. Land and Revenue Administration. Relationship of District administration with functional departments at district level. District rural development agency.

15. State Government and Administration:- Governor, Chief Minister, Council of Ministers. Chief Secretary, State Secretariat. Directorates.

SANSKRIT
PAPER-I

Note: There will be five sections. The question from 1 to 3 sections must be answered either in Sanskrit or in the medium of examination opted by the candidate.

Section 1:

Significant features of grammar with particular stress on Sandhi, Karaka, Samasa, Kartari and Karmani vacyas (voice usages).

Section 2:

1. Main features of Vedic and classical Sanskrit Language.
2. The origin development of classical Sanskrit literature.
3. Contribution of Sanskrit to linguistic studies.
4. Principal trends of literary criticism.

Section 3:

The Essentials of Indian Culture and trends of Indian Philosophy with stress on:

1. Purusartha Chatushtya
2. Samskaras
3. Varnasramavyavastha
4. Mimansa
5. Vedanta
6. Nyaya
7. Vaisesika
8. Sankhya
9. Yoga
10. Buddism
11. Jainism
12. Charvaka

Section 4:

Translation from Hindi/English to Sanskrit.

Section 5:

Short Essay in Sanskrit

PAPER-II

Section A:

Note: It has two sections. Questions from group A,B & C are to be answered either in Sanskrit or in the medium opted by the candidate but questions from group D are to be answered in Sanskrit only.

Group A:

1. Raghuvamsam - (Kalidasa)
2. Sisupalavadham - (Magha)
3. Naisadhiyacaritam - (Sriharsa)
4. Kadambari - (Banabhatta)
5. Dasakumaracaritam - (Dandin)

Group B:

1. Isavasyopanisad
2. Sundarakanda of Valmiki's Ramayana
3. Arthasastra of Kautilya

Group C:

1. Abhijnanasakuntalam - (Kalidasa)
2. Uttararamacaritam - (Bhavabhuti)
3. Mricchakatikam - (Sudraka)
4. Ratnavali - (Sriharshavardhana)

Group D : Short notes in Sanskrit on the following :-

1. Meghadutam - (Kalidasa)
2. Rajatarangini - (Kalhana)
3. Nitisatakam - (Bhartrhari)
4. Gitagovindam - (Jayadeva)
5. Panchtantra

Section B:

Note: Evidence of first hand reading the following selected texts for reading (textual question may be asked from the prescribed portion only) Questions from group A are to be answered in Sanskrit only and the questions from remaining groups are to be answered in Sanskrit or in the medium opted by the candidate.

Group A:

1. Isavasyopanisad (Verses 1 to 18)
2. Kathopanishad (Chapter III Bhrigu valli)
3. Nitisatakam (Verses 1 to 10 Edited by D.D.Kosambi Bharatiya Vidya Bhavan Publication)
4. Sundarakandam of Valmiki (Canto 15, Verses 15 to 30 Geeta Press Edition)

Group B:

1. Raghuvamsam (Canto 1 Verses 1 to 15)
2. Shisupalavadham (Canto 1 Verses 1 to 15)
3. Naisadhiyacaritam (Canto 1 Verses 1 to 15)

Group C :

1. Meghadutam (Purva Megh Verses 1 to 15)
2. Kadambari (Sukanasopadesa only)
3. Kautilya's Arthshastra (IInd Adhyaya of 1st Adhikarna only).

Group D :

1. Abhijan Shakuntalam (IVth act)
2. Uttararamacaritam (Act 1st Verses 30 to 50)
3. Mrchakatikam (Act 1 Verses 15 to 30)

SOCIOLOGY

PAPER-I

PRINCIPLES OF SOCIOLOGY

Sociology – Meaning, nature and scope, emergence of sociology, its relationship with other social sciences, importance of sociology.

Study of Social Phenomena – Social research, the scientific method, objectivity and subjectivity in social sciences.

Basic Concepts – Association, institution, community, social groups, culture.

Social Structure – Status, role, norms and values.

The Individual and Society - Individual and society, socialization; culture and personality; leadership, social control.

Institutions – Family, marriage and kinship-forms, functions and their changing dimension, education, religion, power and authority.

Social Stratification – Meaning, forms and functions; caste, class and their changing dimensions; future of caste.

Types of Societies – Rural, urban and tribal communities-distinctive characteristic, ruralurban continuum, problems of tribal people, tribal development.

The Pioneers in Sociology – Augste Comte- positivism; Karl Marx- materialist conception of history and class struggle; Max Weber- authority and power, the Protestant ethic and spirit of capitalism ; and Durkheim- social solidarity, division of labour and its pathological forms.

Social Change –Meaning, factors and theories of social change; processes of social change– sanskritization, westernization, and modernization; globalization and socio-economic change; trends of change in Indian society.

Science, Technology and Society – Social responsibility of science and technology; human critique of science and technology, environmental issues- pollution of air, water and soil; energy crisis; social impact assessment, environmental awareness, people's action.

Population and Society - Interface between population and social development, population problems, population policy, population controls.

Note: The candidate will be accepted to illustrate theory by facts and to analyze problems with the help of theory. They will be accepted to be particularly conversant with Indian problems.

PAPER-II

SOCIETY IN INDIA

Indian Society – Traditional bases - Varnashrama and dharma; unity and diversity; cultural pluralism and Unitarianism.

The Structure and Composition of Indian Society – villages, towns and cities; rural-urban linkages; tribes- problems, constitutional safeguards and development; weaker sections- dalits, women and minorities, population profile and related issues.

Basic Institutions – Family- forms and changing dimensions; marriage- forms, functions and changing dimensions; kinship- types and regional variations.

Indian Caste System – Origin of caste, its socio-economic and cultural dimensions, issues of equality and social justice; scheduled castes and backward classes -problems, safeguards and welfare.

Rural Class Structure – Classes in India, agrarian classes, peasant movements, land reforms, commercialization of agriculture and change in land use pattern, emerging agrarian unrest, leadership and its changing dimensions.

Social Change – Impact of reform movements, social movements and factors of planned change-Five Year Plans, legislative and executive measures; impact of liberalization, privatization and globalization; trends of change.

Power Structure – Working of the democratic political system in a traditional society; sociocultural basis of political parties; panchayati raj and urban local self-government.

Issues and Problems – Poverty, inequalities of caste and gender; dowry, domestic violence, intergenerational conflict, problems of elderly; regional disparities; ecological degradation and environmental pollution; white collar crime, corruption, drug addiction, suicide.

STATISTICS
PAPER-I

(i) Probability: Classical and Statistical definitions of probability, Importance of the Concept of Probability, Calculation of Probability, Theorems of Probability, Simple theorem of probability with examples. Conditional probability and statistical independence Bayer theorem. Random variables- Discreet and continuous probability functions and probability density functions probability distributions in doreor more varieties. Mathematical expectations.

(ii) Statistical methods- Compilation classification, tabulation and diagrammatic representation of various type of statistical data. Concepts of statistical population land frequency curbs, measures of central tendency and despertions. Moment and commulants, Measure of skewness and Kurtosis Moments-generating function. Hyper-geometric normal Negative Binominal Rectangular and log normal distributions General description of the Presonian system of curves.

(iii) Theoretical distribution, binomial, Poisson and Normal distribution. General properties of a bivariate distribution, bivariate normal distribution, measures of association and contingency, Correlation and Regression Analysis, Difference between correlation and Regression Analysis. Correlation and linear regression involving two or more variables. Correlation ratio interclass correlation Bank correlation, Non-linear regression analysis.

(iv) Sampling methods, basic of sampling types and importance of sampling. Sampling distribution and statistical inference---random sample, statistics concepts of sampling distribution and standard error. Derivation of sampling distribution of mean of independent normal varieties. X2-T and F statistics, their properties and uses. Derivation of sampling, distribution of sample means variances and correlation coefficient from a bivariate normal population. Derivation (in large samples) and uses Personian X2.

(v) Theory of Estimation --- Requirements of a good estimate/biasedness., consistency, efficiency and sufficiency Cramer-Rao bound to variance of estimates. Best linear unbiased estimates. Methods of estimation. General description of the methods of moments, methods

of maximum likelihood of least squares and methods of minimum X2 properties of maximum likelihood estimators (without proof). Theory of confidence intervals, simple problems of setting confidence limits.

PAPER-II

(i) Hypothesis; Meaning, Function, conditions for a valid Hypothesis, Formulation of Hypothesis, Types and Forms of Hypothesis, Theory of testing Hypotheses--- Simple and composite hypothesis, statistical test and critical regions. Two kinds of error, level of significance and power of tests. Optimum critical regions for simple hypothesis concerning one parameter. Construction of such regions for simples hypothesis relating to normal population.

(ii) Likelihood ratio tests--- Tests involving mean, variance correlation and regression coefficients in unvariable and biveriate normal populations, Multiple regression, multiple and partial correlation. Simple non-parametric tests—sign, run-median, rank and randomization tests Sequential test of a simple hypotheses against a simple alternative (without derivation).

(iii) Need for statistical methods, steps in statistical method, sampling techniques, sampling versus complete enumeration, Principle of sampling, Frames and sampling units, Sampling and non-sampling description of multi-stage and multiphase sampling ratio and regression, methods of estimation. Designing of simple surveys and reference to recent large-scale surveys in India.

(iv) Linear statistical models, Theory of Least squares and Analysis of variance, Normal Equations, Least squares estimates and their precision, Test of significance, and interval estimates based on least squares theory in one-way, two-way and three-way classified data.

(v) Design of Experiments---Analysis of variance and coveriance with equal number of observation in “the cells” Transformation of variate to stabilize variance. Principle of experimental designs, completely randomized, randomized block and Latin square designs, missing plot techniques. Factorial experiments and confounding in 2s [s=2 (i) 51.3 and 33] designs. Split pot design, Balanced incomplete designs and simple lattice.

URDU
PAER-I

ANSWER MUST BE WRITTEN IN URDU

SECTION – A

(a) Group of the New Indo – Aryan Language: Western Hindi and its dialect – Khari Boli, Brij Bhasha and Haryanivi;

(b) Relation of Urdu to Khari Bili and Persio- Arabic elements in Urdu;

(c) Development of Urdu from 1300 to 1800 in the North and 1400 – 1700 in Deccan;

(d) Theories about the origin of Urdu Language;

(i) Dakhani Urdu, Origin and Development, its significant distinctive features.
(ii) 18th Century’s Urdu poetry with special reference to Mir-o-Mirza.

SECTION – B

(a) Genre and their development.
Poetry: Ghazal, Qasida, Masnavi, Marsia, Rubai, Jadeed Nazm.
Prose: Dastan, Novel, Short story, Khutoot, Drama.

(b) (i) Significant feature of: (i) Delhi and Lucknow Schools
(ii) Sir Syed movement and Progressive Movement.

(c) Literary criticism with special reference to Hali.

PAPER-II

Answers must be written in Urdu

This paper will require first hand reading of the text prescribed and will be designed to test the candidate's critical ability.

PART – A (PROSE)

1.	Mir Amman	-	Bagh-o-Bahar
2.	Ghalib	-	Intikhab-e-Khutoot-e-Ghalib – Dr.Khaliq Anjum
3.	Hali	-	Muquaddema-e-Shere-o-Shairi
4.	Ruswa	-	Umrao Jan Ada
5.	Prem Chand	-	Wardat
6.	Abdul Kalam Azad	-	Ghubar-e-Khatir
7.	Imtiaz Ali Taj	-	Anar Kali

PART – B (POETRY)

1.	Mir	-	Intikhab-e-Kalam-e-Mir
2.	Sauda	-	Qasaid (including Rewayat)
3.	Ghalib	-	Diwan-e-Ghalib
4.	Iqbal	-	Bal-e-Gibrail
5.	Josh Malihabadi	-	Saif-o-Subu
6.	Firaq Gorakhpuri	-	Ruhe-Kainat
7.	Faiz	-	Kalam-e-Faiz

ZOOLOGY

PAPER-I

NON – CHORDATES AND CHORDATES

Classification of non-chordate (upto subclass) and chordate (upto order) phyla, their general characters and relationship.

PROTOZOA: Structure, life cycle and pathogenicity (if any) of:- Euglena, Giardia, Leishmania, Trypanosoma, Trichomonas, Entamoeba, Plasmodium, Toxoplasma, Eimeria, Paramaecium, Vorticella, Balantidium. Nutrition, locomotion, reproduction.

PORIFERA: Structure and life history of Sycon, Leucosolenia, Canal system, skeleton.

COELETERATA: Structure and life history of Hydra, Obelia, Aurelia, Skeleton, polymorphism, corals and coral reefs.

PLATYHELMINTHES: Structure and life history of Gyrodactylus, Schistosoma, Clonorchis, Paragonimus, Taenia, Echinococcus Origin and evolution of parasitism, parasitic adaptations, larval forms.

NEMATHELMINTHES: Structure and life history of Ascaris, Wuchereria, Ancylostoma, Necator.

ANNELIDA: Structure and life history of Nereis, Pheretima, Hirudo, Metamerism, coelom and trochophore.

ARTHROPODA: Structure and life history of Palaeomon, scorpion, Culex, Anopheles, Aedes, Musca, Larval forms and parasitism in crustacea, economic importance of insects, metamorphosis,mouth parts, respiration and social organization in insects.

MOLLUSCA: Shell, locomotion, feeding habits, respiration, structure and life history of Unio, Pila, Sepia, torsion and detorsion in gastropods.

ECHINODERMATA: Water vascular system, feeding, larval forms, adaptive radiation, structure and life history of Asterias, sea-urchin.

HEMICHORDATA: Affinities of hemichordata, general features and life history of Balanoglossus.

CHORDATA: Origin of chordates, characteristics of subphyla, classification up to order

UROCHORDATA: General characters and life history of Herdmania.

CEPHALOCHORDATA: General characters and life history of Branchiostoma

VERTEBRATA: Comparative anatomy of various systems of vertebrates (integument, skeleton, digestive system, circulatory system, respiratory system, nervous system, excretory system, reproductive system, sense organs)

Pisces : Locomotion, migration, accessory respiratory organs.
Amphibia : Origin of tetrapods, parental care.
Reptilia : Origin of reptiles, interrelationship of reptilian groups.
Aves : Origin of birds, migration.
Mammalia : Origin of mammals, endocrine glands.

CELL AND MOLECULAR BIOLOGY

Structure and functions of cell and its organelles, cell division, organization and Role of microtubules and microfilaments, structure and types of DNA, DNA replication, transcription promoters and transcription factors, translation, genetic code, regulation of gene expression, chromosomes (structure, types, functions) sex determination, Mendelian and non – Mendelian inheritance.

PAPER-II

APPLIED ZOOLOGY, ECOLOGY & BEHAVIOUR, TECHNIQUES & BIOSTATISTICS, EVOLUTION, EMBRYOLOGY, HISTOLOGY, PHYSIOLOGY & BIOCHEMISTRY, IMMUNOLOGY, BIOTECHNOLOGY

APPLIED ZOOLOGY: Aquaculture, sericulture, apiculture, poultry keeping, bacterial and viral diseases (cholera, typhoid, small pox, measles, AIDS), pest management.

ECOLOGY AND BEHAVIOUR : Green – houses effect, pollution and its effects, population growth, wild life sanctuaries in India, competition and niche theory, ecological aspects of behaviour, social behaviour, biological rhythms.

TECHNIQUES AND BIOSTATISTICS: Electrophoresis, centrifugation, spectrophotometry, electron microscopy, chi square test, student t test, F test, standard deviation.

EVOLUTION: Origin of life, theories and evidences of organic evolution, microevolution, eras, evolution of horse and man, drift and speciation.

EMBRYOLOGY: Germ cell, differentiation and migration (in amphibians, birds and mammals), oogenesis, spermatogenesis, fertilization, cleavage, gastrulation in frog and chick, embryonic induction, organogenesis, development and types of placenta, *in vitro* fertilization and embryo transfer.

HISTOLOGY: Histology of skin, stomach, intestine, liver, pancreas, lung, kidney, ovary, testis, spleen and thymus of mammals.

PHYSIOLOGY AND BIOCHEMISTRY: Blood (composition and functions), physiology of digestion, physiology of respiration, physiology of reproduction, physiology of excretion, muscle contraction, hormones secreted by pituitary, thyroid, parathyroid, adrenal and pancreas, feed back inhibition, photoreception, chemoreception, stress and its adaptation, carbohydrates (classification, structure and functions), lipids (classification, structure and functions), proteins (amino acids, types and structure of proteins), conjugated proteins, porphyrins, ATP-cycle, pathways of carbohydrate catabolism, electron transport chain, oxidative phosphorylation.

IMMUNOLOGY : Cells and tissues of immune system, classes and properties of antigen, antibodies and their functions, T – cell (maturation, activation and differentiation), complement system, antigen – antibody reactions, hypersensitivities, transplantation, MHC, autoimmune diseases, vaccines.

BIOTECHNOLOGY: Principles and applications of recombinant DNA technology, development of transgenics, construction of genomic libraries, PCR, DNA finger printing, copyrights of genetically engineered cells.

Appendix-IV

(See Rule 13 (Note-I))

REGULATIONS FOR THE MEDICAL EXAMINATION OF CANDIDATES FOR ADMISSION TO THE HIMACHAL PRADESH ADMINISTRATIVE SERVICE

(These regulations are intended merely for the guidance of Medical Examiners and are not meant to restrict their discretion in any way).

1. To be passed as medically fit for admission to Himachal Pradesh Administrative Service, a candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of the duties of his appointment.

2. The candidate's height will be measured as follows:

   He will remove his shoes and be placed against the standard with his feet together and the weight thrown on the heels and not on the toes or other sides of the feet. He will stand erect without rigidity and with the heels, calves, buttocks and shoulders touching the standard; the chin will be depressed to bring the vertex of the head level under the horizontal bas and the height will be recorded in centimeter.

3. The candidate's chest will be measured as follows:

   He will be made to stand erect with his feet together, and to raise his arms over his head. The tape will be adjusted round the chest that its upper edge touches the inferior angles of the shoulder blades behind and lies in the same horizontal plane when the tape is taken round the chest. The arms will then be lowered to hand loosely by the side, and care will be taken that the shoulders are not thrown upwards or backwards so as to displace the tape. The candidate will then be directed to take a deep inspiration several times and the maximum expansion of the chest will be carefully noted and the minimum and maximum will then be recorded in centimeters, 79-84, etc. In recording the measurements fraction of less than half centimeter should not be noted. The range of expansion should not be less than 5 centimeters.

4. The candidate will also be weighed and his weight recorded in kilo grams; fractions of less than half kilogram should not be noted.

5. The candidate's eye-sight will be tested in accordance with the following rules. The result of each test will be recorded:-

   (i) General: The Candidate's eyes will be submitted to a general examination directed to the detection of any disease or abnormality. The candidate will be rejected if he suffers from any squint or morbid conditions of eyes, eyelids of contiguous structures of such a sort as render or are likely at a future date to render him unfit for service.

   (ii) Visual Acuity: The examination for determining the acuteness of vision includes two test one for distant, the other for near vision. Each eye will be examined separately.

There shall be no limit for minimum naked eye vision but the naked eye vision of the candidates shall, however, be recorded by the Medical Board or other medical authority in every case, as it will furnish the basic information in regard to the condition of the eye.

(a) The standards for distant and near vision with or without glasses shall be as follows:

Distant vision		Near vision	
Better eye	Worse eye	Better eye	Worse eye
6/9	6/9	0.6	0.8
Or			
6/6	6/12		

(b) Subject to the visual standards as laid down above being satisfied, the amount of refractive error allowed will be as follow:-

(i) Total amount of myopia shall not exceed	-----	-8.00 D.
(ii)Total hypermetropia shall not exceed	-----	+6.00 D.

(c) Whenever possible fundus examination should be carried out and results recorded. The necessity for carrying out such examination is, however, left to the discretion of the Medical Board.

(d) The field of vision should be tested by the confrontion method. Where such test gives unsatisfactory or doubtful results, the field of vision should be determined on the per meter.

(e) Night blindness need not be tested as a routine, but only in special cases. No standard test for testing of night blindness or dark adaptation is prescribed. It is left to the discretion of the Medical Board to improvise such rough test, e.g., recording of visual acuity with reduced illumination or by making the candidate recognize various objects in a darkened room after he / she has been there for 20 to 30 minutes. Candidate's own statements should not always be relied upon but they should not always be relied upon but they should be given due consideration.

(f) Ocular condition other than visual acuity: The ocular conditions or diseases which should be considered as a disqualification are as follows:-

(i) Any organic disease or a progressive refractive offer which is likely to result in lowering the visual acuity should be considered as a disqualification.

(ii)Trachoma unless complicated shall not ordinarily be a cause for disqualification.

(iii) Squint: The presence of squint should not be considered as a disqualification if the visual acuity is of the prescribed standard.

(g) The standards prescribed above should be rigidly adhered to.

Relaxation of these standards may, however, be allowed when the age of the candidate at the time of first appointment is 35 years or more. In such cases the standards for vision should be reduced by one step as explained below:-

Better eye	Worse eye
6/6	6/12
Or	
6/9	6/18

(h) When a candidate is declared medically unfit on account of visual acuity, any appeal preferred by him / her should be dealt with by a Special Medical Board, the composition of which should include two Ophthamologists. Ordinarily, the findings of this Special Medical Board should be considered as final but a second appeal shall be permissible in doubtful cases and under very special circumstances. It shall be open to Government to relax any one of the conditions in favour of any candidate for special reasons.

6. The urine (passed in the presence of the examiner) should be examined, the result recorded.

7. The following additional points should be observed:-

(a) that the candidate's hearing in each ear is good and that there is no sign of the disease of the ear;
(b) that his speech is without impediment;
(c) that his teeth are in good order and that he is provided with dentures where necessary for effective mastication (well filled teeth) will be considered as sound;
(d) that his chest is well formed and his chest expansion sufficient and that his heart and lungs are sound;
(e) that there is no evidence of an abdominal disease;
(f) that he is not ruptured;
(g) that he does not suffer from hydrocole, a severe degree or varicocele varicose veins or piles;
(h) that his limbs, hands and feet are well formed and developed and that there is free and perfect motion of all his joints;
(i) that he does not suffer from any inveterate skin disease;
(j) that there is no congenital malformation of defect;
(k) that he does not bear traces of any acute or chronic disease pointing to an impaired constitution; and
(l) that he bears marks of efficient vaccination and evidence of revaccination within the last 12 months.

8. When any defect is found it must be notified in the certificate and the Medical Examiner should state his opinion whether or not it is likely to interfere with the efficient performance of the duties which will be required of the candidate. If the condition is remediable by operation it should be so stated.

9. The following intimation is made for the guidance of the Medical Examiners:-

1. In the medical examination of candidates Medical Officers are especially required to use fact and judgement and to take proper precaution to secure privacy, with the object of removing any objection which may be made by individuals to strip pint.

2. Should a candidate object to the exposure of his person for the detection of hemorrhoids, venereal disease, hernia and disease of the testicles, scrotum and rectum, the candidate must if this examination in his case is in the opinion of the Board necessary, be rejected.

3. The opinion of the Board accepting or rejecting a candidate is final and cannot be questioned on any ground. The Board is debarred from disclosing to any candidate, permanently unfit, the reasons for his rejection. In these cases their opinion and report is to be treated as strictly confidential and for the information of Government only. Where, however, the Board detects a temporary defect amenable to treatment the candidate may be so informed in order that he may have the defect remedied and present himself for re-examination.

4. No person will be deemed qualified for the admission to the service, who shall not satisfy the Government that he has no disease, constitutional affection or bodily infirmity unfitting him of likely to unfit him for the service.

5. It should be understood that the question of fitness involves the future as well as the present, and that the main object of medical examination if to secure continuous effective service, and in the case of candidates for permanent appointment to prevent early pension or payment, in case of premature death. It is at the same time to be noted that the question is one of the likelihood of continuous effective service, and that the rejection of a candidate need not be advised on account of the presence of a defect which is only a small proportion of cases, is found to interfere with continuous effective service.

10. The candidate must make the statement required below prior to his medical examination and must sign the declaration appended thereto. His attention is specially directed to the warning contained in the note below:-

1. State your name in full

2. State your age and birth place

3.(a) Have you ever had small-pox, intermittent or any other fever, enlargement or suppuration of glands, spitting of blood, asthma, inflammation of lungs, hear disease, fainting attacks, rheumatism, or appendicitis ?

OR

(b) Any other disease or accident requiring confinement to bed and medical or surgical treatment.

OR

(c) Suffered from any illness, wound or injuries sustained while on active service with Forces during the last war?

(d) Have you ever rejected by a Medical Board or duly constituted Medical authority?

4. When were you last vaccinated?

5. Have you or any of your near relations been afficated with consumption, scrofula, gout, asthma, fits, epilepsy, or insanity?

6. Have you suffered from any form of nervousness due to overwork or any other cause?

7. Furnish the following particulars concerning your family:-

Father age if living and state of health	Father's age at death and cause of death	Names of brothers living, their ages & State of health	Number of brothers dead, their age at, and cause of death	Mother's age if living and state of health

Mother's age at death and cause of death	Number of sisters living their ages and state of health	Number of sisters dead, their ages at, and cause of death

I declare all the above answers to be, to the best of my belief, true correct and accept the finding of the Board as final.

Candidate's signature

Note:- The candidates will he held responsible for accuracy of the above statement. By willfully suppressing an information he will incur the risk of losing the appointment if appointed or forfeiting all claims of superannuation allowance or gratuity.

Medical Examiner's Report Questions	Answers	Remarks
1. Has the declaration above been signed by the candidate?		
2. Is there any evidence of malformation, congenital or acquired?		
3. Is he free from scars, and has he the full use of all limbs?		
4. Are there any indications of a decided cachectic or diathetic state of constitution?		

5. Has the candidate been vaccinated with in the last twelve months?		
6. Are there any signs of disease of the nervous system?		
7. Is the hearing good? Is there any sign of disease of ears?		
8. What is the candidate vision?	Rev-with glasses-Reads Lev-with glasses-Reads X-Spectacles, if any R.E.-L.E.	
9. Is the candidate free from stammer or other serious defect of speech?		
10. Are there any signs of disease of the bones, joints or parts connected therewith?		
11. Is there any important infection of the skin?		
12. Are the heart and arteries healthy?		
13. Has the candidate hemorrhoids, varicocele, or other infections of veins?		
14. Is there any evidence of disease of respiratory organs?		
15. Are there any signs of disease of the digestive organs?		
16. Is the candidate free from rupture?		
17. Is there any indication of disease of the genital organs?		
18. Is the urine free from:- (1) Albumen? (2) Sugar? Is the urine otherwise normal	(1) (2) ----------	
19. Is there anything in the health of the candidate likely to render him unfit for the efficient discharge of		

his duties in the service?		
20. Do you consider the candidate in all respects qualified for the efficient and continuous discharge of his duties in the service?		
Height (with Shoes)		
Girth of chest	Full inspiration	
Weight		

Dated:

President

Member

Member

Appendix-V

RULES RELATING TO THE SUBJECTS AND STANDARDS OF THE COMPETITIVE PRELIMINARY EXAMINATION OF CANDIDATES FOR HIMACHAL PRADESH ADMINISTRATIVE SERVICE

GOVERNMENT OF HIMACHAL PRADESH
DEPARTMENT OF PERSONNEL (A-IV)

SYLLABUS

FOR

H.P. Administrative Service etc. Combined Competitive Examination (Preliminary)
(NOTIFIED VIDE DEPARTMENT OF PERSONNEL NOTIFICATION No.Per(A-IV)-A(3)-3/84-II dated 18th March, 2011)

(A)	Paper-I General Studies (Code No.01)	This paper shall be of 200 marks and there shall be 100 objective type (multiple choice) questions from the following syllabus:- • History, geography, political, art & culture and socio economic development of Himachal Pradesh. • Current events of national and international importance. • History of India and Indian national movement. • Indian and World Geography - physical, social, economic geography of India and the world. • Indian polity and governance - Constitution, political system, Panchayati Raj, public Policy, Rights issues, etc. • Economic and social development - sustainable development, poverty, inclusion, demographics, social sector initiatives, etc. • General issues on environmental ecology, bio-diversity and climate Change - that do not require subject specialization. • General Science.
(B)	(Paper-II) Aptitude Test (Code No.-02)	This paper shall be of 200 marks and in this paper there shall be 100 objective type (multiple choice) questions from the following syllabus:- • Comprehension. • Interpersonal skills including communication skills. • Logical reasoning and analytical ability. • Decision making and problem solving • General mental ability • Basic numeracy (numbers and their relations, orders of magnitude etc. (Class X level), Data interpretation (charts, graphs, tables, data sufficiency etc. – Class X level) • English Language comprehension skills (Class X level)
(C) *	This preliminary examination will consist of two objective type papers (multiple choice questions) and carry a maximum of 400 marks in the subjects of General Studies and Aptitude Test. This examination is meant to serve as a screening test only. The marks obtained in Preliminary Examination by the candidates who are	

	declared qualified by the Commission for admission to the Main Examination will not be counted for determining their final order of merit. The number of candidates to be admitted to the Main Examination will be about 20 times the total approximate number of vacancies to be filled in the year through this examination. Only those candidates who have been declared to have qualified the Preliminary Examination by the Commission will be eligible for admission to the Main Examination corresponding to the said Preliminary Examination provided they are otherwise eligible for admission to the Main Examination. Provided that Aptitude Test (Paper-II) of the Preliminary Examination will be a qualifying paper with minimum qualifying marks fixed at 33% and, therefore, marks obtained in this paper shall not be counted for determining the merit of the candidates to be drawn exclusively on the basis of marks obtained in General Studies (Paper-I) of the Preliminary Examination for their admission to the Main Examination. Note: There will be negative marking for incorrect answers (as detailed below) for all questions:-. (i) There will be four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, one third (0.33) of the marks assigned to that question will be deducted as penalty. (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happen to be correct and there will be same penalty as above for that question. (iii) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question.
(D)	The duration of Papers No.1 and II (General Studies and Aptitude Test) will be two hours each.

* - Amended vide Department of Personnel Notification No.Per(A-IV)-A(3)-1/2012-II dated 30th June, 2016.

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