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TEST BOOKLET SERIES

TEST BOOKLET

AP(CE)-2017

B

Time Allowed : 2 Hours]

[Maximum Marks : 100

All questions carry equal marks.

INSTRUCTIONS

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.

2. **Encode clearly the test booklet series A, B, C or D as the case may be in the appropriate place in the answer-sheet.**

3. Write your Roll Number only in the box provided alongside. Do not write anything else on the Test Booklet.

4. This Test Booklet contains **100** items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.

5. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :

Ⓐ   Ⓑ   ⬤   Ⓓ

6. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, No erasing/fluid is allowed.

7. You have to mark all your responses ONLY on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. *Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.*

8. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking and ¼ (0.25) of the marks will be deducted as penalty for wrong answer.

9. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.

10. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.

11. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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1.   In Surveying, areas less than .... are treated as plane.

      (A) 200 km^2 (B) 220 km^2

      (C) 240 km^2 (D) 260 km^2

2.   The ranging rods painted alternatively either red and white or black and white in length of .... i.e. one link length of a metric chain.

      (A) 20 cm   (B) 25 cm

      (C) 30 cm   (D) 35 cm

3.   .... are those errors which occur in either direction and tend to compensate at the end.

      (A) Instrumental errors   (B) Compensating errors

      (C) Cumulative errors   (D) Personal errors

4.   In a well shaped triangle, the angles are between :

      (A) 15 and 150°   (B) 20 and 140°

      (C) 25 and 130°   (D) 30 and 120°

5.   .... is used to reproduce an enlarged or reduced drawing.

      (A) Planimeter   (B) Current meter

      (C) Pantograph   (D) Alidade

6. In prismatic compass, 0° is written at :

    (A) East end   (B) West end

    (C) North end   (D) South end

7. In Surveyor Compass, 90° is written at :

    (A) North end   (B) South end

    (C) East end   (D) None of these

8. One Length Staff is graduated to :

    (A) 5 mm   (B) 10 mm

    (C) 15 mm   (D) 20 mm

9. An imaginary line joining intersection of cross hairs at diaphragm to the optical

    centre of the object glass is called :

    (A) Axis of Telescope   (B) Line of Collimation

    (C) Line of Sight   (D) Axis of Bubble Tube

10. The station at which backsight and foresight both are taken is called :

    (A) Station   (B) Change Point

    (C) Bench Mark   (D) None of these

11. .... of a fluid is the volume of the fluid per unit weight of the fluid.

   (A) Specific gravity of a fluid   (B) Viscosity

   (C) Specific volume   (D) Specific weight

12. At .... pressure, water coverts into vapour at ambient temperature.

   (A) 2.5 m head of water   (B) –2.5 m head of water

   (C) –5.0 m head of water   (D) –7.5 m head of water

13. If a thin lamina is dipped in water vertically, centre of pressure will be .... the centroid of lamina.

   (A) below   (B) at the same level of

   (C) above   (D) no fixed relationship

14. For a stable equilibrium, metacentre of the body should be :

   (A) above the centre of gravity

   (B) below the centre of gravity

   (C) coinciding with the centre of gravity

   (D) coinciding with the centre of buoyancy

15. The correct relationship between coefficient of contraction, coefficient of velocity and coefficient of discharge is :

(A) $C_c = C_v \, C_d$

(B) $C_v = C_c \, C_d$

(C) $C_d = C_v \, C_c$

(D) None of these

16. The shape of .... weir is so designed that the discharge over the weir is linearly related to the head of water over the crest.

(A) Sutro

(B) Cipolletti

(C) Ogee

(D) Broad Crested

17. A 2% error of head measurement in V-notch will introduce an error of .... in discharge measurement of the notch.

(A) 2%

(B) 3%

(C) 4%

(D) 5%

18. When gravitational forces alone are predominant, a model may be taken dynamically similar to the prototype if the ratio of inertia to the gravitational forces is the same in model and prototype. Alternatively one can compare .... of the model and the prototype.

(A) Mach Number

(B) Euler Number

(C) Reynolds Number

(D) Froude Number

19. In a pipe flow, total energy line is .... the hydraulic gradient line.

   (A) coinciding with

   (B) below

   (C) above

   (D) no fixed relationship with

20. Hydraulic transmission of power through pipes will be maximum when head loss through friction is :

   (A) one-third of total energy head at inlet of pipe

   (B) one-fourth of total energy head at inlet of pipe

   (C) one-fifth of total energy head at inlet of pipe

   (D) one-sixth of total energy head at inlet of pipe

21. The Stokes' law used for sedimentation analysis is valid for the particle size range of :

   (A) 0.2 to 2 mm

   (B) 0.02 to 0.2 mm

   (C) 0.002 to 0.2 mm

   (D) 0.0002 to 0.2 mm

22. In gradation of curve for particles sizes, coefficient of curvature is defined as :

   (A) $Cc = D^2_{30}/(D_{60} \times D_{10})$

   (B) $Cc = D^2_{60}/(D_{30} \times D_{10})$

   (C) $Cc = D^2_{10}/(D_{30} \times D_{60})$

   (D) None of these

23. The mean value of 1.7 kPa may be adopted as the present best estimate of undrained shear strength of a soil when it is at :

(A) plastic limit

(B) liquid limit

(C) shrinkage limit

(D) none of these

24. A clay is classified as ...., if its sensitivity is 70.

(A) Sensitive

(B) Very sensitive

(C) Quick

(D) Slightly quick

25. As per IS : 1498, Silts of liquid limit above 50%, MH is described as :

(A) Inorganic silts of high plasticity

(B) Inorganic clays of high plasticity or fat clays

(C) Organic clays of high plasticity

(D) None of the above

26. A soil shows free swell as 150%, this soil as per IS : 1498 is classified as soil of :

(A) low expansion

(B) medium expansion

(C) high expansion

(D) very high expansion

27. A soil is having coefficient of permeability 10^{-9} cm/sec. This is a soil of type :

(A) Clean gravel

(B) Clean sand and gravel mixture

(C) Mixture of sand silt clay

(D) Intact clay

28. Field measurement of permeability test is feasible when coefficient of permeability for the soils is *not* less than :

   (A) 10^{-1} cm/sec

   (B) 10^{-2} cm/sec

   (C) 10^{-3} cm/sec

   (D) 10^{-4} cm/sec

29. When water bearing porous formation is surrounded by formations of impermeable material, it is called :

   (A) aquifer

   (B) unconfined aquifer

   (C) confined aquifer

   (D) aquiclude

30. Contact pressure distribution below a rigid uniformly loaded foundation on clay is :

   (A) uniformly distributed

   (B) parabolically varying i.e. zero at edges and maximum at centre

   (C) parabolically varying i.e. minimum at centre and maximum at the edges

   (D) none of the above

31. Stones should always be placed in such a manner that natural bed is .... to the pressure that the stone has to carry.

   (A) parallel

   (B) right angle

   (C) acute angle

   (D) obtuse angle

32. A good brick earth should preferable contain alumina :

   (A) 20 to 30% by weight

   (B) 30 to 40% by weight

   (C) 40 to 45% by weight

   (D) 45 to 50% by weight

33. Five parts of good quality fine clay are mixed with three parts of crushed pottery, one part of powdered glass, two parts of clean white sand and a suitable colouring substance is used in :

(A) Mangalore tiles   (B) Allahabad tiles

(C) Terracotta   (D) Coloured bricks

34. .... can be used for structural purposes.

(A) Class A i.e. Eminently hydraulic lime

(B) Class B i.e. Semi-hydraulic lime

(C) Class C i.e. Fat lime

(D) Class D i.e. Magnesium lime

35. Now specifications for 43 grade cement are available in :

(A) IS : 8112   (B) IS : 269

(C) IS : 15269   (D) IS : 1489

36. Gauged mortar is :

(A) Lime mortar   (B) Cement mortar

(C) Lime Cement mortar   (D) Fire Resistant mortar

37. .... are thin horizontal veins radiating from the pith towards bark.

(A) Cambium layer   (B) Medullary rays

(C) Annual rings   (D) None of these

38. Principal plane is that plane on which :

    (A) shear stress is minimum

    (B) shear stress is maximum

    (C) product moment of inertia is zero

    (D) none of the above

39. A maximum value of Poisson's ratio may be :

    (A) 0.2   (B) 0.3

    (C) 0.4   (D) 0.5

40. In a plane strain problem, ...

    (A) stress in perpendicular to the plane direction is zero

    (B) stress in perpendicular to the plane direction is non-zero

    (C) strain in perpendicular to the plane direction is non-zero

    (D) none of the above

41. If a concentrated transverse load passes through shear centre, ...

    (A) Bending moment on the member will be zero

    (B) Shear force on the member will be zero

    (C) Torsion on the member will be zero

    (D) Bending moment and shear force on the member will be zero

42. Sanitary sewage is :

    (A) domestic sewage

    (B) industrial sewage

    (C) total sum of domestic and industrial sewage

    (D) none of the above

43. Pumping plants are designed for :

    (A) 5 to 10 years   (B) 15-20 years

    (C) 30-40 years   (D) 40-50 years

44. Hourly variation (i.e. ratio of maximum flow to average flow) in sewage flow of lateral and small sewers upto 0.25 m in diameter may be taken as :

    (A) 1.5   (B) 2.0

    (C) 3.0   (D) 4.0

45. Sewer pipes of sizes less than 0.4 m diameter are designed as running .... at maximum discharge.

    (A) 1/2 full   (B) 2/3 full

    (C) 3/4 full   (D) full

46. Generation of self-cleaning velocity in the sewer at least .... is important and should be considered.

    (A) once a day   (B) once in 2 days

    (C) twice in a week   (D) once in a week

47. Non-scouring limiting velocity in cement concrete sewers is :

(A) 2.5 to 3.0 m/sec

(B) 3.0 to 4.0 m/sec

(C) 3.5 to 4.5 m/sec

(D) 4.5 to 5.5 m/sec

48. .... theory is fairly well justified for ductile materials in most load resisting members and machine parts.

(A) Maximum Principal Stress

(B) Maximum Principal Strain

(C) Maximum Shear Stress

(D) Maximum Strain Energy

49. When a simply supported beam of span 'l' is subjected to a constant moment 'M' at distance 'a' from left support and 'b' from right support. The reaction at left support will be :

(A) M.b/l

(B) M.a/l

(C) M/l

(D) None of these

50. If you have to lift an electric pole of length 'l' by anchoring it at 2 points, maximum moment induced should be minimum, location of these 2 points will be :

(A) 0.1l from ends

(B) 0.15l from ends

(C) 0.2l from ends

(D) 0.207l from ends

51. Ratio of maximum shearing stress to average shearing stress in circular section is :

(A) 2.5

(B) 2.0

(C) 1.5

(D) 1.33

52. An internal hinge of a beam will be replaced by .... in conjugate beam for the same.

(A) an internal hinge

(B) a link

(C) a roller support

(D) none of these

53. When three springs are in series, stiffness of the composite spring is :

(A) $1/s = 1/s1 + 1/s2 + 1/s3$

(B) $s = s1 + s2 + s3$

(C) any one of the above

(D) none of the above

54. Method of section should not cut more than .... members in a truss, when used for its analysis.

(A) 1

(B) 2

(C) 3

(D) none of these

55. An activity, which neither requires any time nor any resource for its completion, is called :

(A) Successor activity

(B) Predecessor activity

(C) Critical activity

(D) Dummy activity

56. In case of negative slack, ...

(A) $T_L > T_E$

(B) $T_L = T_E$

(C) $T_L < T_E$

(D) None of these

57. Total float of an activity is =

(A) available time for the activity – activity time

(B) maximum available time for the activity – activity time

(C) minimum available time for the activity – activity time

(D) none of the above

58. With reference to total cost of a project, optimal duration of the project has been determined. Which of the following statements is *correct* ?

(A) Total cost of the project is increasing with increase in duration

(B) Total cost of the project is increasing with decrease in duration

(C) Both of the above

(D) None of the above

59. In some extraordinary situations, it may be unavoidable to provide still steeper gradients at least for short stretches, such steeper gradients are called :

(A) Ruling gradients   (B) Limiting gradients

(C) Exceptional gradients   (D) Minimum gradients

60. These signs are circular in shape and white in colour with a red border, such signs are called :

(A) Stop and Give-way signs   (B) No stopping signs

(C) Speed limit signs   (D) Prohibitory signs

61. Which lake is the source of Parbati river of Kullu District of H.P. ?

   (A) Suraj Tal   (B) Chandra Tal

   (C) Mantilai Lake   (D) Nako Lake

62. Which of the following is a tributary of the Sutlej river ?

   (A) Patsari   (B) Asni

   (C) Baspa   (D) Baner

63. In which District of H.P. is Thamsar mountain peak ?

   (A) Kullu   (B) Kinnaur

   (C) Chamba   (D) Lahaul-Spiti

64. Who was the first Englishman to reach Rohtang pass ?

   (A) W. Moorcraft   (B) J.G. Gerad

   (C) Lord Elgin   (D) None of these

65. Which of the following places is known for naga shrine which cures people of snake bite ?

   (A) Nagchala (Mandi)   (B) Kamru Nag (Mandi)

   (C) Tripal (Kangra)   (D) All of these

66. Which community in H.P. was engaged earlier in extracting gold by washing sand on the river banks ?

(A) Daole

(B) Chhimbe

(C) Jhewar

(D) Dhobi

67. In which river basin is Allain Duhangan hydro power project in H.P. ?

(A) Ravi

(B) Beas

(C) Sutlej

(D) Yamuna

68. What is the amount of cash incentive given in H.P. under Indira Gandhi Matritva Sahyog Yojna ?

(A) Rupees Six Thousand

(B) Rupees Ten Thousand

(C) Rupees Fifteen Thousand

(D) Rupees Twenty Thousand

69. Which of the following does *not* fall in the category of Medium Irrigation Projects in H.P. ?

(A) Sidhatha (Kangra)

(B) Balh valley (Mandi)

(C) Shahnehar Project (Kangra)

(D) Changer Area Bilaspur

70. What is the extent of subsidy on agriculture inputs to the Scheduled Caste tea planters in H.P. ?

(A) 20 percent

(B) 30 percent

(C) 40 percent

(D) 50 percent

71. To which team did the Indian Men's Hockey team lose in the Quarter final at the 2016 Rio Olympics ?

   (A) Argentina

   (B) Canada

   (C) Belgium

   (D) Germany

72. Which organisation's tag line is 'Serving Customers with a Smile' ?

   (A) Air-India

   (B) LIC

   (C) Indian Ministry of Tourism

   (D) Indian Railways

73. Where is Sariska Tiger Park in Rajasthan ?

   (A) Ranthambore

   (B) Alwar

   (C) Sikar

   (D) Sirohi

74. What role did Durga Bhabi play in the India's freedom movement ?

   (A) organised swadeshi movement in Punjab

   (B) set up a Mahila Brigade

   (C) helped S.C. Bose to escape from India

   (D) revolutionary spy who helped Bhagat Singh and his associates

75. To which political party does Kurmi leader Anupriya Patel belong ?

   (A) BJP

   (B) Apna Dal

   (C) BJD

   (D) None of these

76. Which country's first woman President is Tsai Ing-Wen ?

   (A) Cambodia   (B) Vietnam

   (C) South Korea   (D) Taiwan

77. When were two Bangladesh war criminals hanged for crimes against humanity during the liberation war of 1971 ?

   (A) November 21, 2015   (B) December 21, 2015

   (C) January 21, 2016   (D) February 21, 2016

78. Which country occupies top position in Human Development Index (HDI) 2015 ?

   (A) Australia   (B) Sweden

   (C) Norway   (D) Denmark

79. Who among the following did *not* travel in the inaugural run of train through Gotthard Base Tunnel ?

   (A) Angela Merkel   (B) Francois Hollande

   (C) Theresa May   (D) Matteo Renzi

80. Approximately how many people died in the Mediterranean Sea Shipwreck in May 2016 ?

   (A) 200   (B) 400

   (C) 600   (D) Over 700

81. To avoid local buckling before achieving the Limit State, based on width to thickness ratio of plate elements of a steel cross-section, the steel cross-sections are classified into :

(A) 4 classes

(B) 5 classes

(C) 6 classes

(D) 7 classes

82. Maximum effective slenderness ratio is restricted to ...., when a member normally acting as tie in a roof truss or a bracing system not considered effective when subjected to possible reversal of stress into compression resulting from wind or earthquake forces.

(A) 180

(B) 250

(C) 300

(D) 350

83. In steel structures, if one way of longitudinal bracing is provided at the centre of the building, the length of the building section may be restricted to .... in case of covered buildings.

(A) 60 m

(B) 120 m

(C) 180 m

(D) None. of these

84. Partial safety factors of .... are used to check Limit State of Serviceability.

(A) 0.8 for both Dead and Live loads

(B) 1.0 for Dead load and 0.8 for Live load

(C) 0.8 for Dead load and 1.0 for Live load

(D) 1.0 for both Dead and Live loads

85. If a hole is made by punching process for a fastener of 20 mm diameter, deduction for the hole is made for :

(A) 20 mm

(B) 21.5 mm

(C) 22 mm

(D) 24 mm

86. In the design of column bases, the maximum bearing pressure should *not* exceed the bearing strength, which is equal to :

(A) $0.45 \, f_{ck}$

(B) $0.5 \, f_{ck}$

(C) $0.55 \, f_{ck}$

(D) $0.6 \, f_{ck}$

87. The effective slenderness ratio of a laced column is taken as .... the actual maximum slenderness ratio, in order to account for shear deformation effects.

(A) 1.05 times

(B) 1.10 times

(C) 1.15 times

(D) 1.20 times

88. In a plate girder, maximum ratio of depth of web to its thickness cannot exceed ....

(A) $250 \, \varepsilon_w$

(B) $300 \, \varepsilon_w$

(C) $350 \, \varepsilon_w$

(D) $400 \, \varepsilon_w$

89. The minimum size of a fillet weld on the thicker part of 20 mm thickness cannot be less than :

(A) 2 mm

(B) 3 mm

(C) 4 mm

(D) 5 mm

90. For earthquake analysis of a building, one should refer :

(A) IS : 801

(B) IS : 2911

(C) IS : 804

(D) IS : 1893

91. A concrete should have slump of ...., if it is to be used for lightly reinforced sections in slabs, beams, walls and columns.

(A) 0 mm

(B) 0-25 mm

(C) 25-75 mm

(D) >75 mm

92. Maximum cement content in concrete excluding flyash and ground granulated blast furnace slag should not exceed :

(A) 450 kg/m^3

(B) 500 kg/m^3

(C) 550 kg/m^3

(D) 630 kg/m^3

93. Minimum cement content in plain concrete to be used in mild exposure condition, including flyash and ground granulated blast furnace slag should not be less than :

(A) 220 kg/m^3

(B) 240 kg/m^3

(C) 250 kg/m^3

(D) 260 kg/m^3

94. Total number of test strength of samples required to constitute an acceptable record of calculation of standard deviation should not be less than :

(A) 15

(B) 20

(C) 25

(D) 30

95. .... is the design depth of concrete cover to all steel reinforcements, including links.

(A) Total cover

(B) Clear cover

(C) Effective cover

(D) Nominal cover

96. When a beam is subject to torsion in addition to bending moment and shear force. Side face reinforcement in this beam should be provided if its overall depth exceeds :

(A) 450 mm

(B) 550 mm

(C) 650 mm

(D) 750 mm

97. The total area of side face reinforcement in a beam should not be less than :

   (A) 0.1% of the web area, which should be distributed equally on two faces at a spacing not exceeding 300 mm or web thickness whichever is less

   (B) 0.1% of the web area, which should be distributed equally on two faces at a spacing not exceeding 250 mm or web thickness whichever is less

   (C) 0.1% of the web area, which should be distributed equally on two faces at a spacing not exceeding 200 mm or web thickness whichever is less

   (D) 0.1% of the web area, which should be distributed equally on two faces at a spacing not exceeding 300 mm

98. In case of pedestals, in which longitudinal reinforcement is not taken into account in strength calculations, nominal longitudinal reinforcement less than .... of the cross-sectional area should not be provided.

   (A) 0.04%   (B) 0.10%

   (C) 0.12%   (D) 0.15%

99. In Flat slabs, minimum thickness of slabs should *not* be less than :

   (A) 80 mm   (B) 100 mm

   (C) 120 mm   (D) 125 mm

100. When a footing is resting directly on soil, minimum thickness of the footing should *not* be less than :

   (A) 150 mm   (B) 200 mm

   (C) 250 mm   (D) 300 mm