DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

TEST BOOKLET

ARO-2015

Time Allowed : 2 Hours]   [Maximum Marks : 100

All questions carry equal marks.

INSTRUCTIONS

Important Note : *There are four parts of Question Paper i.e. Part 'A', 'B', 'C' & 'D'. The candidates may opt either of the parts from Part-A (Economics with Statistics), B (Mathematics) & C (Statistics) according to their choice as per their essential qualification. Part 'D' is compulsory to all (Question No. 41 to 100).*

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.   **The candidates must encode the relevant part i.e. (A, B or C) which he/she chosen to attempt, in the column of Booklet series.**

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 :

(A)   (B)   ●   (D)

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.

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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PART-A

(Economics with Statistics)

1. Which of the following statements are *correct* regarding Cobb-Douglas Production function ?

    (*i*)   It is a short period production function

    (*ii*) It assumes constant returns to scale

    (*iii*) It is a long period production function

    (*iv*) Output elasticities with respect to factors are variable

    Choose the *correct* answer from the codes given below :

    (A) (*i*) and (*ii*)   (B) (*i*) and (*iv*)

    (C) (*ii*) and (*iii*)   (D) (*iii*) and (*iv*)

2. The average revenue curve of a firm is also known as :

    (A) Income curve   (B) Cost curve

    (C) Demand curve   (D) Offer curve

3. Which one of the following is *correct* for Phillips Curve ?

    It shows the relationship between :

    (A) Rate of employment and rate of change in money wages

    (B) Rate of employment and rate of change in money wages

    (C) Rate of employment and change in real wages

    (D) Rate of unemployment and change in tax revenue

4. Which one of the following is *not* included in Linear Economics ?

   (A) Game Theory

   (B) Input-Output Analysis

   (C) Linear Programming

   (D) Neoclassical optimisation

5. In IS-LM analysis, the increase in money supply will shift :

   (A) LM curve rightward

   (B) LM curve leftward

   (C) IS curve rightward

   (D) IS curve leftward

6. Match List I with List II and choose the *correct* code from the following :

   List I

   (1) Rostow

   (2) Hirschman

   (3) Nelson

   (4) Amartya Sen

   List II

   (a) Choice of Technique

   (b) Stages of development

   (c) Unbalanced growth

   (d) Equilibrium trap

   Codes :

	(1)	(2)	(3)	(4)
(A)	(b)	(d)	(a)	(c)
(B)	(a)	(c)	(d)	(b)
(C)	(d)	(c)	(b)	(a)
(D)	(b)	(c)	(d)	(a)

7. In the theory of demographic transition, in which stage an ideal population growth rate is achieved ?

    (A) First stage

    (B) Second stage

    (C) In between first stage and second stage

    (D) Third stage

8. For a linear demand curve :

    (A) Slope is constant but elasticity of demand varies

    (B) Slope varies but elasticity of demand is constant

    (C) Slope as well as elasticity of demand both are constant

    (D) Slope as well as elasticity of demand both varies

9. A consumer is said to be in equilibrium when he spends his whole income according to which of the following law/principle ?

    (A) Law of supply and demand

    (B) Principle of equi-marginal utility

    (C) Law of increasing returns

    (D) Law of diminishing marginal utility

10. The theory of potential surprise is given by :

   (A) Irving Fischer
   (B) G.L.S. Shackle

   (C) J.M. Keynes
   (D) Schumpeter

11. Which of the following correctly represents Investment Multiplier ?

   (A) $1 - \dfrac{\Delta C}{\Delta Y}$
   (B) $1 - \dfrac{\Delta Y}{\Delta C}$

   (C) $\left(1 - \dfrac{\Delta C}{\Delta Y}\right)^{-1}$
   (D) $\left(1 - \dfrac{\Delta Y}{\Delta C}\right)^{-1}$

12. Which of the following explains the relationship between tax rates and changes in tax revenue ?

   (A) Lorenz Curve
   (B) Laffer Curve

   (C) Logistic Curve
   (D) Gompertz Curve

13. Who propounded the Factor Endowment Theory of International Trade ?

   (A) David Ricardo
   (B) Jacob Viner

   (C) Bertin Ohlin
   (D) Adam Smith

14. Who amongst the following economists has given the idea of Steady State Growth ?

   (A) R.M. Solow
   (B) A.H. Hausen

   (C) E. Domar
   (D) N. Kaldor

15. Who amongst the following introduced money in growth models for the first time ?

    (A) J. Robinson   (B) R.F. Harrod

    (C) R.M. Solow   (D) J. Tobin

16. Wagner's hypothesis is related with :

    (A) Public Debt   (B) Public Expenditure

    (C) Public Revenue   (D) All of these

17. 'Pahal' scheme is related with :

    (A) Direct transfer of scholarship

    (B) Direct transfer of LPG subsidy

    (C) Encouraging education of girl child

    (D) Curbing migration from rural areas to urban areas

18. Which one of the following years will be celebrated as 'Jal Kranti Varsh' ?

    (A) 2015-16   (B) 2016-17

    (C) 2017-18   (D) 2019-20

19. In which year, MNREGA was implemented in whole India ?

    (A) 2006   (B) 2007

    (C) 2008   (D) None of these

20. What is the base year of newly introduced Consumer Price Index ?

   (A) 2000   (B) 2010

   (C) 2011   (D) 2012

21. Which of the following tax had been proposed to be abolished in the Union Budget 2015-16 ?

   (A) Wealth Tax   (B) Excise Duty

   (C) Corporation Tax   (D) Capital Gains Tax

22. On March 25, 2015 Reserve Bank of India signed Currency Swap Agreement, the amount being 400 million with which of the following countries ?

   (A) Nepal   (B) Sri Lanka

   (C) Bhutan   (D) Bangladesh

23. Which of the following defines a situation of down payment ?

   (A) Domestic retail transaction

   (B) Hire-purchase transaction

   (C) Domestic wholesale transaction

   (D) None of the above

24. In which years, the Special Economic Zones were promoted ?

   (A) 1996   (B) 1999

   (C) 2000   (D) 2006

25. Which of the following statements is *not* correct for National Payments Corporation of India (NPCI) ?

   (A) It operates under the Ministry of Finance, Govt. of India

   (B) It is a nodal agency for all retail payment systems in India

   (C) It is incorporated in the year 2008

   (D) It has been entrusted to link DBT accounts with Aadhar Numbers

26. According to XII Five Year Plan, which of the following would be having largest expenditure during the plan period ?

   (A) Agriculture and Allied Services

   (B) Financial Services

   (C) Fisheries and Forestry

   (D) Social Services

27. In which Five Year Plan, the slogan of 'Garibi Hatao' was given ?

   (A) Second   (B) Third

   (C) Fourth   (D) Fifth

28. Consider the following statements and select the *correct* code given below :

Assertion (A) : State Finance Commission is a Constitutional body.

Reason (R) : Union Finance Commission cannot recommend financial assistance to panchayats.

Codes :

(A) Both (A) and (R) are correct, and (R) is the correct explanation of (A)

(B) Both (A) and (R) are correct, but (R) is not the correct explanation of (A)

(C) (A) is correct, but (R) is false

(D) (A) is false, but (R) is correct

29. Consider the following statements about causes of urbanisation. Select the *correct* code :

(1) High rate of industrialisation

(2) High standard of living in rural areas

(3) High level of emigration from rural to urban areas

(4) Greater degree of employment opportunities in cities

Codes :

(A) (1), (2) and (3) are correct

(B) (1), (3) and (4) are correct

(C) (2), (3) and (4) are correct

(D) (1), (2), (3) and (4) all are correct

30. Who has propounded the People's Plan ?

   (A) Jai Prakash Narayan   (B) M.N. Roy

   (C) Shriman Narayan   (D) Vinoba Bhave

31. The mean of 7 numbers is 26. The mean of first three numbers is 20, whole the mean of last three is 29. What would be value of the remaining number ?

   (A) 30   (B) 35

   (C) 24.5   (D) 45

32. A fair coin is tossed thrice. The probability of getting at least two heads is :

   (A) $\dfrac{1}{4}$ (B) $\dfrac{1}{8}$

   (C) $\dfrac{3}{8}$ (D) $\dfrac{1}{2}$

33. Which of the following is *correct* for Fisher's Factor Reversal Test ?

   (A) $P_{01} \times Q_{01} = \dfrac{\Sigma p_0 q_0}{\Sigma p_1 q_1}$ (B) $P_{01} \times Q_{01} = \dfrac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$

   (C) $P_{01} \times Q_{10} = \dfrac{\Sigma p_0 q_0}{\Sigma p_1 q_1}$ (D) $P_{10} \times Q_{01} = \dfrac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$

34. If the variance of a series is 169, then the standard deviation will be :

   (A) 11   (B) 43

   (C) 13   (D) 14

35. The variance of a given series is 6. If each item of the series is multiplied

   by 2, then what would be variance of new series ?

   (A) 6   (B) 12

   (C) $\sqrt{6}$ (D) 36

36. The measure of the degree of association between two non-quantifiable

   variables is called :

   (A) Correlation Coefficient   (B) Regression Coefficient

   (C) Coefficient of Association (D) Co-variance

37. Cumulative Frequency Curve can be used to find :

   (A) Arithmetic Mean   (B) Median

   (C) Mode   (D) Skewness

38. The value of Kurtosis of a normal distribution is :

(A) Zero

(B) Unity

(C) 3

(D) >3

39. In a village, the number of people are as follows (in thousand) :

	Children	Adults	Old
	150	500	250

The angle substituted at the centre in a pie-diagram corresponding to children is :

(A) 60°

(B) 100°

(C) 250°

(D) 75°

40. The monthly income of six teachers of a school are (in Rs.) 14000, 16500, 16500, 18000, 23000 and 32000. The number of teachers having income more than the mode and less than the mean income is :

(A) Zero

(B) 1

(C) 2

(D) 3

PART-B

(Mathematics)

1. If $f(z) = \dfrac{1}{z-3} e^{1/(z-3)}$, then :

    (A) $f(z)$ has essential singularity at $z = 0$

    (B) $f(z)$ has a pole at $z = 3$

    (C) $f(z)$ has removable singularity at $z = 3$

    (D) $f(z)$ has essential singularity at $z = 3$

2. Which one of the following statements is *incorrect* ?

    (A) $f(z) = \sin z$ is bounded in $\mathbf{C}$

    (B) $f(z) = e^z$ is periodic in $\mathbf{C}$

    (C) $f(z) = \log z$ is multivalued function in $\mathbf{C} \backslash \{0\}$

    (D) $f(z) = e^z$ is entire function

3. The value of the integral $\displaystyle\oint_{|z|=1} z^2 e^{1/z^2} dz$ is :

    (A) 0   (B) $2\pi i$

    (C) πi (D) $-\pi i$

4. The image of the disk $|z - 1| \leq 1$ under the mapping $w = \dfrac{z-1}{z-2}$ is :

    (A) a disk   (B) an annulus

    (C) a vertical strip   (D) a half plane

5. Which one of the following is *false* ?

   (A) Any two norms are equivalent on à finite-dimensional vector space

   (B) Any two finite dimensional normed spaces of the same dimension are isomorphic

   (C) Closed unit ball in a finite dimensional normed linear space is compact always

   (D) Not all linear operators from $\mathbf{R}^n$ to $\mathbf{R}^n$ are continuous

6. If H and K are Hilbert space and $T : H \to K$ is a bounded linear operator, then :

   (A) $\text{Ker } T = (\text{Im } T^*)^{\perp}$

   (B) $\text{Ker } T = (\text{Im } T)^{\perp}$

   (C) $\text{Im } T = (\text{Im } T^*)^{\perp}$

   (D) $\text{Ker } T = (\text{Ker } T^*)^{\perp}$

7. Which one of the following spaces is *not* complete ?

   (A) The space l^{∞} of all bounded sequences with supremum norm $\|x\| = \sup_i |x_i|$ where $x = (x_i)$

   (B) The space of all continuous functions $f : [a, b] \to \mathbf{R}$ with norm $\|f\| = \max_{x \in [a, b]} |f(x)|$

   (C) The space of all continuous functions f on $[a, b]$ with norm

   $$\|f\| = \left(\int_a^b |f(t)|^2 \, dt \right)^{1/2}$$

   (D) The space $\mathbf{R}^n$ with norm $\|x\| = \sqrt{x_1^2 + x_2^2 + \dots + x_n^2}$, where $x = (x_1, x_2, \dots, x_n)$

8. Let $X = \mathbf{R}^2$, $\|(x, y)\|_p = (|x|^p + |y|^p)^{1/p}$ for $1 \leq p < \infty$ and $\|(x, y)\|_\infty = \max\{|x|, |y|\}$. Then the unit sphere in X is :

   (A) the interior of a square if $p = 1$ or ∞

   (B) interior of a circle if $p = 2, 1/2$

   (C) a convex set if $p = 1/2$

   (D) always circular region

9. Which one of the following sets in $\mathbf{R}^2$ is *not* connected ?

   (A) $\{(x, y) : x^2 + y^2 = 1\}$ (B) $\{(x, y) : 1 < x^2 + y^2 < 2\}$

   (C) $\{(x, y) : x^2 + y^2 \leq 1\}$ (D) $\cdot$ $\{(x, y) : xy = 1\}$

10. Which one of the following is *true* ?

    (A) Product of two Hausdorff spaces need not to be Hausdorff

    (B) Product of two normal spaces is normal

    (C) Product of two regular spaces is regular

    (D) Product of two Lindelof spaces is Lindelof

11. Consider the topological space $\mathbf{R}_l$ which is the set $\mathbf{R}$ with lower limit topology. Then which of the following is *false* ?

    (A) $\mathbf{R}_l$ is separable   (B) $\mathbf{R}_l$ is second countable

    (C) $\mathbf{R}_l$ is a Lindelof space   (D) $\mathbf{R}_l$ is countable

12. Let X, Y be a compact Hausdorff spaces. Then :

    (A) If Z ⊆ X, then Z is compact

    (B) f(X) is compact if f is continuous

    (C) X × Y is not compact

    (D) X ∪ Y is not compact

13. Which one of the following is a metrizable space ?

    (A) Hausdorff space with countable bases

    (B) Compact Hausdorff space

    (C) Normal space with a countable basis

    (D) Regular space

14. The fundamental theorem of calculus does *not* apply to the function :

    (A) $f(x) = \tan^{-1} x$ for $x \in [a, b]$

    (B) $f(x) = |x|$ for $x \in [-2, 2]$

    (C) $f(x) = x^2 \cos 1/x^2$ for $x \in (0, 1]$, $f(0) = 0$

    (D) $f(x) = x^2$ for $x \in [a, b]$

15. The series $\sum_{n=1}^{\infty} (-1)^n \frac{x^2 + n}{n^2}$:

(A) converge uniformly in every bounded interval but does not converge absolutely for any value of x

(B) does not converge uniformly in every bounded interval

(C) converge absolutely for all x

(D) converge uniformly and absolutely for all x

16. Which one of the following functions is *not* Riemann integrable on the interval $[0, 1]$?

(A) $f(x) = \begin{cases} 0, & \text{if } x \text{ is rational} \\ 1, & \text{if } x \text{ is irrational} \end{cases}$

(B) $f(x) = \lim_{n \to \infty} \cos^{2n}(24\pi x)$

(C) $f(x) = \begin{cases} \cos x, & \text{if } x \in [0, 1/2] \\ 1, & \text{if } x \in [1/2, 1] \end{cases}$

(D) $f(x) = K$, where K is any constant

17. The Taylor series expansion of the function $f(x) = x \tan^{-1} x - \frac{1}{2}\log(1 + x^2)$ about the origin in the region $\{|x| < 1\}$ is :

(A) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n}}{(2n-1)(2n)}$

(B) $\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{(2n-1)(2n)}$

(C) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^{2n}}{(n-1)n}$

(D) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n}{(2n-1)(2n)}$

18. A coin is tossed until a tail appears. The expectation of the number of tosses required is :

(A) 2

(B) 3

(C) 1

(D) 0

19. Which one of the following statements is *not* correct ?

(A) For binomial distribution, mean > variance

(B) For Poisson distribution, mean = variance

(C) For geometric distribution, mean < variance

(D) For negative binomial distribution, mean > variance

20. The moment generating function of $Y = \log \chi^2$, where χ^2 follows Chi-square distribution with n degrees of freedom, is :

(A) $M_Y(t) = 2^t \Gamma\left(\frac{n}{2} + t\right) \Big/ \Gamma\left(\frac{n}{2}\right)$

(B) $M_Y(t) = 2\Gamma\left(\frac{n}{2} + t\right) \Big/ \Gamma\left(\frac{n}{2}\right)$

(C) $M_Y(t) = 2^t \Gamma\left(\frac{n}{2}\right) \Big/ \Gamma\left(\frac{n}{2} + t\right)$

(D) $M_Y(t) = 2^t \Gamma\left(\frac{n}{2} + t\right) \Big/ \Gamma\left(\frac{n}{2} - t\right)$

21. The regular and irregular singular points of the differential equation $x^3(x - 1)y'' - 2(x - 1)y' + 3xy = 0$ are :

(A) 1, 0 respectively

(B) 0, 1 respectively

(C) 1, 2 respectively

(D) 2, 1 respectively

22. Which one of the following statements is *correct* ?

   (A) At least one eigen value of Sturm-Liouville problem is complex

   (B) At most one eigen value of Sturm-Liouville problem is real

   (C) All eigen values of Sturm-Liouville problem are real

   (D) All eigen values of Sturm-Liouville problem are complex

23. The function $f(x, y) = y^{1/2}$ satisfies a Lipschitz condition on rectangle R of the form :

   (A) $R : |x| \leq a, b \leq y \leq c, (a > 0, b \geq 0, c > 0)$

   (B) $R : |x| \leq a, b \leq y \leq c, (a > 0, b > 0, c \geq 0)$

   (C) $R : |x| \leq a, b \leq y \leq c, (a > 0, b \geq 0, c \geq 0)$

   (D) $R : |x| \leq a, b \leq y \leq c, (a > 0, b > 0, c > 0)$

24. The general solution ϕ of the differential equation $y' + (\cos x)y = e^{-\sin x}$ satisfies the condition :

   (A) $\phi(\pi k) - \phi(0) = \pi k$ for $k \in \mathbf{Z}$

   (B) $\phi(\pi k) - \phi(0) = -\pi k$ for $k \in \mathbf{Z}$

   (C) $\phi(\pi k) + \phi(0) = 2\pi k$ for $k \in \mathbf{Z}$

   (D) $\phi(\pi k) + \phi(0) = -2\pi k$ for $k \in \mathbf{Z}$

25. Wilson's theorem states that an integer p is a prime if and only if :

(A) $(p - 1)! = -1 \pmod{p}$

(B) $p! = -1 \pmod{p - 1}$

(C) $(p - 2)! = -1 \pmod{p}$

(D) $(p - 1)! = -1 \pmod{p + 1}$

26. Let p be a prime and n a positive integer. Then the exponent k such that $p^k \mid n!$ is :

(A) at most $\sum\limits_{i=1}^{\infty} \left[\dfrac{n}{p^i}\right]$

(B) at least $\sum\limits_{i=1}^{\infty} \left[\dfrac{n}{p^i}\right]$

(C) exactly $\sum\limits_{i=1}^{\infty} \left[\dfrac{n}{p^i}\right]$

(D) exactly $\sum\limits_{i=1}^{n} \left[\dfrac{n+1}{p^{i+1}}\right]$

27. The general solution of the homogeneous recurrence relation of second order $4x_{n+1} + 8x_n + 3x_{n-1} = 0$ is :

(A) $x_n = c_1\left(-\dfrac{3}{2}\right)^n + c_2\left(-\dfrac{1}{2}\right)^n$

(B) $x_n = c_1\left(\dfrac{3}{2}\right)^n + c_2\left(\dfrac{1}{2}\right)^n$

(C) $x_n = c_1\left(-\dfrac{3}{2}\right)^n + c_2\left(\dfrac{1}{2}\right)^n$

(D) $x_n = c_1\left(\dfrac{3}{2}\right)^n + c_2\left(-\dfrac{1}{2}\right)^n$

28. The total number of edges in a complete graph of n vertices are :

(A) n

(B) $n/2$

(C) $n^2 - 1$

(D) $n(n - 1)/2$

29. In a beauty contest, half the number of experts voted for Aakash and two thirds voted for Bikram. 10 voted for both and 6 did not vote for either. How many experts were there in all ?

   (A) 18   (B) 24

   (C) 36   (D) 40

30. A measure m defined on a σ-algebra M is countably subadditive if :

   (A) $m\left(\bigcup_{1}^{\infty} E_n\right) \leq \sum_{1}^{\infty} m(E_n)$ (B) $m\left(\bigcup_{1}^{\infty} E_n\right) = \sum_{1}^{\infty} m(E_n)$

   (C) $m\left(\bigcup_{1}^{\infty} E_n\right) \geq \sum_{1}^{\infty} m(E_n)$ (D) $m\left(\bigcap_{1}^{\infty} E_n\right) = \sum_{1}^{\infty} m(E_n)$

31. Which one of the following is *false* for Lebesgue outer measure m^* ?

   (A) $m^*(\mathbf{Q}) = 0$ (B) $m^*(A) \leq m^*(B)$ if $A \subseteq B$

   (C) $m^*(A + x) = m^*(A)$ (D) $m^*([0, 1]) = 0$

32. Let $\langle f_n \rangle$ be a sequence of non-negative measurable functions and $f_n(x) \to f(x)$ a.e. on E. Then Fatou's Lemma states that :

   (A) $\overline{\lim} \int_E f_n \leq \int_E f$ (B) $\int_E f \leq \underline{\lim} \int_E f_n$

   (C) $\underline{\lim} \int_E f_n \leq \int_E f$ (D) $\int_E f \leq \overline{\lim} \int_E f_n$

33. Which one of the following is *false* for an absolutely continuous function

   $f : [a, b] \rightarrow \mathbf{R}$?

   (A) f is a function of bounded variation on $[a, b]$

   (B) $f'(x) = 0$ a.e. $\Rightarrow f$ is constant

   (C) f has a derivative everywhere

   (D) f is an indefinite integral

34. Which one of the following statements is *correct* ?

   (A) the ideal $\langle x^2 + 1 \rangle$ is not prime in $\mathbf{Z}_2[x]$

   (B) the ideal $\langle x^2 + 1 \rangle$ is prime in $\mathbf{Z}_2[x]$

   (C) the ideal $\langle x^2 + 1 \rangle$ is not maximal in $\mathbf{R}[x]$

   (D) the ideal $n\mathbf{Z}$ is prime if and only if n is not prime

35. For the set of Gaussian integers $\mathbf{Z}[i] = \{a + ib : a, b \in \mathbf{Z}\}$, which one of the

   following statements is *false* ?

   (A) The ring of Gaussian integers is an integral domain

   (B) The ring of Gaussian integers is subring of complex number $\mathbf{C}$

   (C) The ring of Gaussian integers is a field

   (D) The ring of Gaussian integers has 0 characteristic

36. The ring $\mathbf{Z} \oplus \mathbf{Z}$ is a :

   (A) commutative ring   (B) integral domain

   (C) field   (D) has no unity

37. If G is a group of order 15, then :

   (A) G is cyclic   (B) G is not cyclic

   (C) G is not isomorphic to Z_{15} (D) G is isomorphic to Z_{14}

38. The polynomial $x^2 - 2$ is :

   (A) reducible over $\mathbf{R}$ (B) not reducible over $\mathbf{R}$

   (C) reducible over $\mathbf{Z}$ (D) reducible over $\mathbf{Q}$

39. For the pay-off matrix $\begin{pmatrix} -1 & -2 & 8 \\ 7 & 5 & -1 \\ 6 & 0 & 12 \end{pmatrix}$, the value of game is :

   (A) 1/3   (B) 10/3

   (C) 20/3   (D) 20

40. The solution of the linear programming problem max $z = 5x + 7y$ subject to the constraints $x + y \le 4$, $3x + 8y \le 24$, $10x + 7y \le 35$, and $x, y \ge 0$ is :

   (A) max $z = 24$ (B) max $z = 24.4$

   (C) max $z = 24.8$ (D) max $z = 24.9$

PART-C

(Statistics)

1. If

$$A = \sum_{i=1}^{n} \left(x_i - \bar{x}\right)^2$$

$$B = \sum_{i=1}^{n} \sum_{j=1}^{n} \left(x_i - x_j\right)^2$$

then B is equal to :

(A) $4nA$

(B) $4n^2A$

(C) $2nA$

(D) $2n^2A$

2. Four years ago, the average age of a family of four persons was 18 years. During this period, a baby was born. Today, if the average age of the family is still 18 years, the age of the baby is :

(A) 2.5 years

(B) 2.0 years

(C) 1.2 years

(D) 3.0 years

3. The second and third moments of a sample of five observations (−4, −2, 0, 2, 4) are :

(A) (8, 0)

(B) (4, 0)

(C) (8, 4)

(D) (0, 4)

4. For the consistency of data on two attributes A and B, the following condition is not necessary :

   (A) $(AB) \leq (A)$

   (B) $(AB) \leq (B)$

   (C) $(AB) \geq (A) + (B) - N$

   (D) $(AB) \leq N - (A) - (B)$

5. Let G_1 be the geometric mean of n values of X and G_2 be the geometric mean of n values of Y. Let G be the geometric mean of $2n$ values of X and Y combined. Then :

   (A) $G^2 = \dfrac{G_1}{G_2}$

   (B) $G^2 = \dfrac{G_1 + G_2}{2}$

   (C) $G = G_1 G_2$

   (D) $G^2 = G_1 G_2$

6. If A and B are two events for which $P(A) = x$, $P(B) = y$, $P(AB) = z$, then $P(\bar{A} \cup \bar{B})$ is :

   (A) $1 - xy$

   (B) $1 - z$

   (C) $x + y$

   (D) $(1 - x)(1 - y)$

7. If $P(A \cup B) = \dfrac{5}{6}$, $P(A \cap B) = \dfrac{1}{3}$, $P(B) = \dfrac{1}{2}$, then the events are :

   (A)   mutually exclusive

   (B)   dependent

   (C)   independent

   (D)   equally likely

8. In a certain college, there are 600 students, out of which 350 are boys and 250 girls. The number of Indian and Foreign students is 450 and 150 respectively. The number of foreign boys is 50. The number of Indian girls is :

(A) 100

(B) 150

(C) 200

(D) 300

9. Let a random variable X takes values 19, 18, 25, 27, 28. The minimum value of $\sum_{i=1}^{5} |X_i - A|$ is obtained when A is :

(A) 25

(B) 15

(C) 18

(D) 26

10. For a continuous random variable X with probability density function :

$$f(x) \quad = e^{-x} \quad , \quad 0 < x < \infty$$

$$= 0 \quad , \quad \text{otherwise}$$

If A = {x; 0 < x < 1} is an event, then P(A) is :

(A) $1 + e^{-1}$

(B) $1 - e^{-1}$

(C) e^{-1}

(D) $1 - e$

11. Let the joint probability mass function of (X, Y) be :

$$f(x, y) = \frac{x + y}{2!}, \qquad \left. \begin{array}{l} x = 1, 2, 3 \\[4pt] y = 1, 2 \end{array} \right\}$$

Then P(X = 3) is :

(A) $\dfrac{3}{9}$

(B) $\dfrac{4}{9}$

(C) $\dfrac{3}{7}$

(D) $\dfrac{4}{7}$

12. The joint probability density function of two random variables X and Y is :

$$f(x, y) = \begin{cases} 4xy & ; \quad 0 \le x \le 1, 0 \le y \le 1 \\[6pt] 0 & ; \quad \text{elsewhere} \end{cases}$$

Then the value of $P\left(0 < X < \dfrac{1}{2}, \dfrac{1}{2} < Y < 1 \right)$ is :

(A) $\dfrac{3}{16}$

(B) $\dfrac{1}{4}$

(C) $\dfrac{5}{16}$

(D) $\dfrac{3}{8}$

13. A discrete random variable X takes values −1, 2 and 3 with probabilities $p(-1) = \dfrac{1}{3}$, $p(2) = \dfrac{1}{3}$ and $p(3) = \dfrac{1}{3}$, then $E[\,|X|\,]$ is :

(A) $\dfrac{3}{2}$

(B) $\dfrac{5}{2}$

(C) $\dfrac{9}{2}$

(D) 2

14. For a random variable X, $E(X) = 3$, $E(X^2) = 12$ and $E(X^3) = 96$. Then the third central moment μ_3 is :

(A) −28

(B) 14

(C) 36

(D) 42

15. The moment generating function of a random variable X is :

$$M_X(t) = \frac{1}{6} + \frac{1}{3}e^{9t} + \frac{1}{2}e^{12t^2}$$

Then E(X) is :

(A) 9

(B) $\dfrac{35}{12}$

(C) 11

(D) $\dfrac{55}{6}$

16. For a negative binomial variable X, let $n = 3$, $p = \dfrac{1}{4}$, then E(X) is :

(A) 5

(B) 6

(C) 9

(D) 8

17. A normal random variable has mean equal to 2 and variance equal to 4. Its fourth central moment μ_4 is :

(A) 16

(B) 32

(C) 64

(D) 48

18. If X and Y are independent Poisson variates such that :

$P[X = 2] = P[X = 3]$ and

$P[Y = 3] = P[Y = 4]$

then variance of $(X - 3Y)$ is :

(A) 3

(B) 39

(C) 24

(D) 36

19. Which one of the following is *not* true for the distribution function $F(x)$?

(A) $0 \leq F(x) \leq 1$

(B) $F(0) = \dfrac{1}{2}$

(C) $F(-\infty) = 0$

(D) $F(+\infty) = 1$

20. For 'sampling inspection plan' extensive tables have been provided by :

(A) Hajeek and Renyi

(B) Cramer and Rao

(C) Dodge and Romig

(D) Cauch and Schwartz

21. A lot of size N having fraction defective p, is to be inspected by a single sampling plan of size n and OC function P_a. The expression for the average time inspection ATI of the plan is :

(A) $nP_a + N(1 - P_a)$

(B) $NP_a + n(1 - P_a)$

(C) $(N - 1)P_a + nP_a$

(D) None of these

22. Let X be a normal variate with mean 0 and variance unity. Let Y be a

Chi-square variate with n degrees of freedom and let X and Y be independent.

The distribution of $z = \dfrac{X\sqrt{n}}{\sqrt{Y}}$ is :

(A) χ^2 distribution

(B) normal distribution

(C) t-distribution

(D) F-distribution

23. X has a negative binomial distribution with probability of success i.e.

occurrence of event E, equal to 0.4 and that of failure equal to 0.6. The event

E occurs 16 times in the distribution. The variance of this distribution is :

(A) 50

(B) 60

(C) 70

(D) 80

24. Let $\bar{x}$ be the mean of a random sample of size n drawn from a normal population

$N(\theta, \sigma^2)$. Then the following estimator is not consistent for θ :

(A) $\bar{x} - \dfrac{1}{6n}$

(B) $\dfrac{n\bar{x} + 50}{n + 30}$

(C) $\dfrac{n\bar{x}}{n + 20} + \dfrac{1}{n(n + 6)}$

(D) $(a + n)\bar{x} - \dfrac{b}{n + 5}$

where a and b are positive, greater than zero.

25. Let T_1 and T_2 be two unbiased estimators of a parameter θ. The following estimator is also unbiased for θ :

(A) $\dfrac{3aT_1 + 3aT_2}{6a}$

(B) $aT_1 - \dfrac{3}{2}aT_2$

(C) $aT_1 + bT_2$

(D) $\dfrac{a_1T_1 + a_2T_2}{a_1 + a_2 + 4}$

26. Consistency of an estimator is :

(A) Small sample property only

(B) Large sample property only

(C) Both large and small sample property

(D) None of the above

27. In order to test the goodness of fit in non-parametric case, the following test may be used :

(A) Sign test

(B) Mann-Whitney test

(C) Kolmogorov-Smirnov test

(D) None of these

28. Let X_1, X_2, ..., X_n be a random sample from a uniform distribution $U(0, 1)$. The rth order statistic $X_{(r)}$ has :

(A) Uniform distribution $U(0, r)$

(B) Beta distribution $B(r, n - r + 1)$

(C) Gamma distribution $G(r, nr)$

(D) None of the above

29. Let $\underline{X}_1$ be $p \times 1$ vector having a non-singular p-variate normal distribution $N(\underline{\mu}, \Sigma)$, the distribution of $(\underline{X} - \underline{\mu})' \Sigma^{-1}(\underline{X} - \underline{\mu})$ is :

(A) χ^2

(B) univariate normal

(C) p-variate normal

(D) none of these

30. For random samples drawn from a multivariate normal population, the sample mean vectors and sample covariance matrices are always :

(A) independent and identically distributed

(B) not independent and not identically distributed

(C) non-independently but identically distributed

(D) independent but not identically distributed

31. Let $\bar{X}$ be the mean of a random sample of size n from $N(\theta, 9)$. If $(\bar{X} - 1, \bar{X} + 1)$ is a 90% confidence interval for θ, then the sample size n should be :

(A) 16

(B) 24

(C) 15

(D) 05

32. Let (X_1, X_2) be a random sample from pdf $f_\theta(x)$. For testing hypothesis $f_0 = N(0, 1)$ against the alternative hypothesis $f_1 = \left[\dfrac{2}{\pi}\right]^{\frac{1}{2}} e^{-x^2/2}, x > 0$, a critical region $C = \left\{(x_1, x_2) : x_1^2 + x_2^2 > \log_e 9\right\}$ is obtained. Then (α, β) is :

(A) $\left(\dfrac{1}{3}, \dfrac{1}{9}\right)$

(B) $\left(\dfrac{1}{3}, \dfrac{1}{3}\right)$

(C) $\left(\dfrac{1}{3}, \dfrac{2}{3}\right)$

(D) $\left(\dfrac{2}{3}, \dfrac{1}{3}\right)$

33. The regression equations of Y on X and X on Y are respectively Y = X and 4X – Y = 3, then the correlation coefficient between X and Y is :

(A) 0

(B) –0.5

(C) 1

(D) 0.5

34. A 4 × 4 Latin square design provides the following incomplete ANOVA table :

Source of Variation	S.S.
Columns	7.5
Rows	46.5
Treatments	—
Error	55
Total	113

Then the F-ratio for treatments is :

(A) 0.27

(B) 0.145

(C) 1.69

(D) 2.45

35. In a Latin square design with one missing observation, the totals of row, column and treatment having the missing observation are 25, 40 and 35 respectively and the grand total is 100. Then the estimate of missing observation is :

(A) 25

(B) 30

(C) 24

(D) 35

33

36. In a factorial experiment, 4 treatments are used at 2 levels each. All the treatment combinations are tried in 4 randomized blocks. For this design the error degrees of freedom are :

(A) 55

(B) 35

(C) 45

(D) 25

37. In a BIBD there are b incomplete blocks, 13 varieties, 4 plots per block, each variety being replicated 4 times, a pair of treatment occurring together in the design in blocks is one. How many degrees of freedom will be there for the error component ?

(A) 31

(B) 21

(C) 27

(D) 25

38. Consider a population of size N = 500 with population mean 45 and population variance 15. Let $\bar{y}_w$ be the sample mean of the simple random of size 100 drawn with SRSWR and $\bar{y}_{wo}$ be the sample mean of size 100 drawn with SRSWOR. Then the ratio of their variance $V(\bar{y}_w)/V(\bar{y}_{wo})$ is :

(A) $\dfrac{1497}{80}$

(B) $\dfrac{499}{400}$

(C) $\dfrac{400}{499}$

(D) $\dfrac{6000}{499}$

39. A population consisting of 1000 units is divided into two strata such that $N_1 = 600$ and $N_2 = 400$. To estimate the population mean of the variable y for which $S_1 = 1$ and $S_2 = 3$ for the two strata. A sample of 45 observations is to be allocated according to Neyman's optimum allocation.

Find what would be the sample sizes for the two strata ?

(A) (35, 10)

(B) (20, 25)

(C) (24, 21)

(D) (15, 30)

40. Let X_i and Y_i be the values of the size variable and the study variable for the ith population unit, $i = 1, 2, \ldots\ldots, N$. A sample of size n is obtained in the form of n units without replacement draws, where in each draw the probability of selecting the ith unit. P_i is proportional to X_i, such a sample is called probability proportional to size without replacement (PPSWOR) sample. Desraj obtained order estimator :

$$\hat{Y}_{DR} = \frac{1}{n} \sum_{i=1}^{n} t_i, \text{ where } t_i = y_1 + y_2 + \ldots\ldots + y_{i-1} + \frac{y_i}{p_i}\left(1 - p_1 \ldots\ldots p_{i-1}\right)$$

For this estimator he obtained an unbiased estimator of the variance as below :

(A) $\dfrac{1}{N(n-1)} \sum\limits_{i=1}^{n} \left(t_i - \bar{t}\right)^2$

(B) $\dfrac{1}{n(N-1)} \sum\limits_{i=1}^{n} \left(t_i - \bar{t}\right)^2$

(C) $\dfrac{1}{n(n-1)} \sum\limits_{i=1}^{n} \left(t_i - \bar{t}\right)^2$

(D) $\dfrac{1}{n(n-1)} \sum\limits_{i=1}^{n} \left(t_i + \bar{t}\right)^2$

where $\bar{t} = \dfrac{1}{n} \sum\limits_{i=1}^{n} t_i$

PART-D

(General Knowledge) Compulsory to all

41. In which district of H.P. is Mahakali lake ?

    (A) Kullu   (B) Lahaul-Spiti

    (C) Chamba   (D) Shimla

42. Which stream rises from Kupar peak near Jubbal in H.P. ?

    (A) Pabbar   (B) Giri

    (C) Bata   (D) Andhra

43. Which is the largest glacier in H.P. ?

    (A) Bara Shigri   (B) Dudhon

    (C) Mukkila   (D) Gora

44. Near which town/village of Chamba district is Subhash Baoli ?

    (A) Sahu   (B) Mahla

    (C) Dalhousie   (D) Sarol

45. At which place in Shimla District is Mahunag temple ?

    (A) Khob   (B) Chanavag

    (C) Balag   (D) Nirath

46. Which is the ruling deity of Malana village of Kullu District ?

(A) Shrigul

(B) Jamlu

(C) Mahasu

(D) Bijjat

47. With which region of H.P. are Bura and Sih (ballet and opera) associated ?

(A) Kullu-Manali

(B) Jubbal-Rohru

(C) Bilaspur-Una

(D) Chamba-Kangra

48. Which *Purana* is commonly recited during the mourning period after a death in the family ?

(A) Shiv Purana

(B) Vishnu Purana

(C) Garud Purana

(D) Vayu Purana

49. Which fair is celebrated during three different months in the Buddhist Himalayan region ?

(A) Phagli

(B) Sissu

(C) Pori

(D) Ladrech

50. In which district of H.P. is Simbalbara sanctuary ?

(A) Kangra

(B) Shimla

(C) Sirmaur

(D) Solan

51. What was the old name of Baijnath ?

    (A) Trigart   (B) Kirgram

    (C) Mahakal   (D) Chandpur

52. In which year was Bhuri Singh Museum in Chamba inaugurated ?

    (A) 1890   (B) 1908

    (C) 1917   (D) 1922

53. During which festival there is (was) a practice to show mirror to the villagers
    by the barber ?

    (A) Sair   (B) Pulech

    (C) Cherwal   (D) Gochi

54. Which raja of Mandi was imprisoned by Maharaja Sansar Chand of
    Kangra ?

    (A) Ishwari Sen   (B) Suraj Sen

    (C) Sidh Sen   (D) Shyam Sen

55. Which raja of Bushahar state was given the title of Chhatrapati by
    Aurangzeb ?

    (A) Chattar Singh   (B) Padam Singh

    (C) Kehri Singh   (D) Ram Singh

56. Which raja of Sirmaur laid the foundation of Nahan city ?

(A) Budhi Prakash   (B) Suraj Prakash

(C) Veer Prakash   (D) Karam Prakash

57. Which raja made Madho Rai the presiding deity of Mandi princely state ?

(A) Suraj Sen   (B) Ajbar Sen

(C) Bahu Sen   (D) Sidh Sen

58. Around which year was the Treaty of Sangauli signed between the British and the Gurkhas ?

(A) 1809   (B) 1815

(C) 1837   (D) 1846

59. Which was the smallest princely state in the Kangra-Una area ?

(A) Guler   (B) Nurpur

(C) Jaswan   (D) Kutlchar

60. When was Victoria bridge on Beas at Mandi town of H.P. constructed by the British ?

(A) 1877   (B) 1887

(C) 1897   (D) 1907

61. When did the Kangra princely state come under the direct control of the British ?

(A) 1833

(B) 1837

(C) 1846

(D) 1849

62. Which princely state's off-shoot was Siba princely state ?

(A) Guler

(B) Datarpur

(C) Jaswan

(D) Nurpur

63. Which raja of Bilaspur princely state invited the Gurkhas to invade Kangra ?

(A) Devi Chand

(B) Jagat Chand

(C) Hira Chand

(D) Mahan Chand

64. Which is the smallest district of Himachal Pradesh ?

(A) Una

(B) Hamirpur

(C) Solan

(D) Bilaspur

65. Which was the ancestral village of Hindi writer Yashpal in Hamirpur district of H.P. ?

(A) Rangas

(B) Saproh

(C) Choru

(D) Bhumpal

66. To which village of Bilaspur District of H.P. did the great warrior, Zoravar Singh who joined the army of Maharaja Gulab Singh of Jammu and conquered Ladakh and invaded Tibet, is said to belong ?

   (A) Kandraur   (B) Bharari

   (C) Bhadrug   (D) Dadhol

67. Which district of H.P. has the lowest Sex-Ratio (2011 census) ?

   (A) Bilaspur   (B) Una

   (C) Hamirpur   (D) Kangra

68. To which area of Mandi district did Thakur Karam Singh, who was the chairman of H.P. Territorial Council during 1957-63 belong ?

   (A) Jogindernagar   (B) Sarkaghat

   (C) Chachiot   (D) Dharampur

69. When was Indira Gandhi Medical College, Shimla established ?

   (A) 1966   (B) 1971

   (C) 1976   (D) 1977

70. On which river is Larji hydel power project ?

   (A) Satluj   (B) Beas

   (C) Chenab   (D) Ravi

71. In a zoo-point Roster which vacancies are reserved in H.P. for the visually handicapped ?

(A) 1st and 101st

(B) 30th and 130th

(C) 73rd and 173rd

(D) 87th and 187th

72. Agency of which country is assisting in Swan River integrated watershed management project ?

(A) Germany

(B) Australia

(C) Canada

(D) Japan

73. When was Bilaspur 'C' state merged with Himachal Pradesh ?

(A) 1953

(B) 1954

(C) 1955

(D) 1956

74. At which place in Shimla District is Powder Milk Plant ?

(A) Hiranagar

(B) Duttnagar

(C) Bral

(D) Fagu

75. How much discount in fare is allowed by the HRTC under its Green Card Scheme ?

(A) 10 percent

(B) 20 percent

(C) 25 percent

(D) 30 percent

76. Who is developing a system of tracking the progress of children's education in H.P. ?

(A) Project Officer, SSA

(B) Department of elementary education

(C) Pratham

(D) All of the above

77. What is the approximate number of urban local bodies in H.P. ?

(A) 40   (B) 50

(C) 60   (D) 70

78. Around which year was Kalka-Shimla Railway track included in the UNESCO heritage list ?

(A) 2001   (B) 2007

(C) 2010   (D) 2011

79. Which local deity was invoked by the HPCA to ward off rain during the India-South Africa T-20 Match held in October, 2015 ?

(A) Mahunag   (B) Bhagsunag

(C) Indrunag   (D) Kamrunag

80. Near which area of Shimla town is Chadwick fall ?

(A) Sanjauli   (B) Kasumpti

(C) Phagli   (D) Summer Hill

81. With which faction of National Socialist Council of Nagaland (NSCN) has the government of India signed a peace accord in August, 2015 ?

(A) Isak-Muivah (IM)

(B) Koh Khole-Ki-Tovi (KK)

(C) Reformation (R)

(D) All of these

82. Who is Ram Nath Kovind ?

(A) A Marathi Writer

(B) CEO of Google

(C) Governor of Bihar

(D) Director, Nehru Memorial Museum and Library

83. What is Chandigarh's rank in cleanliness in the survey conducted by the Ministry of Urban Development, Govt. of India in 2015 ?

(A) 01

(B) 11

(C) 21

(D) 31

84. Which Indian wrestler won Bronze Medal at the World Wrestling Championship held at La Vegas in September, 2015 ?

(A) Sushil Kumar

(B) Amrit Kumar

(C) Narsingh Pancham Yadav

(D) None of these

85. Who is the author of *Swasthya Ka Anmol Marg : Prakritik Chikitsa* ?

(A) Swami Ram Dev

(B) Acharya Dev Vrat

(C) Acharya Bal Krishan

(D) Sri Sri Ravishankar

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86. With which community is Paryushan Parva associated ?

    (A) Buddhist   (B) Jain

    (C) Christian   (D) Muslim

87. Which Indian State announced in June, 2015 three years imprisonment for feeding monkeys ?

    (A) Himachal Pradesh   (B) Uttarakhand

    (C) Haryana   (D) Punjab

88. Which student organisation was banned by the IIT Madras around May, 2015 ?

    (A) Democratic Youth Federation of India

    (B) Revolutionary Student Federation of India

    (C) Ambedkar-Periyar Study Circle

    (D) PMK

89. Who was appointed coach of India Under-19 Cricket Team by the BCCI in June, 2015 ?

    (A) Rahul Dravid   (B) Saurav Ganguli

    (C) Ravi Shastri   (D) VVS Luxman

90. Who was appointed the Chairman of the Committee to review Public-Private Partnership (PPP) model for infrastructural development recently ?

    (A) Pradeep Bajpai   (B) Vijay Kelkar

    (C) Rajendra Kumar   (D) P.K. Sinha

91. When was new (second) Suez canal inaugurated ?

    (A) June, 2015   (B) July, 2015

    (C) August, 2015   (D) September, 2015

92. What is Rosh Hashanah ?

    (A) a non-vegetarian dish   (B) a city in Iraq

    (C) Jewish New Year   (D) a mosque in UAE

93. Which global agency has endorsed a plan to de-criminalise sex work ?

    (A) Transparency International

    (B) Amnesty International

    (C) Global Human Rights Watch

    (D) UN Committee on gender equality

94. In a deal signed by various political parties of Nepal how many provinces of Nepal will have border with India ?

    (A) Three   (B) Four

    (C) Six   (D) Seven

95. According to Global Peace Index released in June, 2015 which was the *least* peaceful country in the world ?

    (A) Iraq   (B) Egypt

    (C) Syria   (D) Nigeria

96. Who is Alexis Tsipras ?

   (A) A Swiss Tennis player

   (B) Leader of opposition in the House of Commons in U.K.

   (C) A US Presidential hopeful of the Republican Party

   (D) Prime Minister of Greece

97. According to the Report released by the UN's FAO in Rome in May, 2015 which country of the world has the highest number of under nutritioned people ?

   (A) Ethiopia   (B) China

   (C) India   (D) Pakistan

98. In which country is Kruen where G-7 Summit was held in June, 2015 ?

   (A) Belgium   (B) Switzerland

   (C) Germany   (D) Poland

99. Which Bangladeshi blogger was hacked to death around May, 2015 ?

   (A) Ananya Azad   (B) Ananta Bijay Das

   (C) Munir Hussain   (D) Ahmed Mohamed

100. At its meeting on September 22, 2015 the European Union was sharply divided on the relocation plan relating to refugees. While several east European countries opposed the plan, one country abstained from voting. Which was it ?

   (A) Hungary   (B) Cezch Republic

   (C) Finland   (D) Romania