

**Instructions:**

- 1) **The question paper consists of 5 parts A,B,C,D,E**
- 2) **Part A carries 10 marks, Part B carries 20 marks, Part C carries 30 marks, Part D carries 30 marks and Part E carries 10 marks.**
- 3) **Write the question numbers properly as indicated in the question paper.**

PART-A**I Answer any TEN questions****10 x 1 = 10**

- 1 Give the canonical representation of 96.
- 2 Define power set with an example.
- 3 If $A = \{1,3,5\}$ $B = \{5\}$ find the $A \times B$.
- 4 Simplify: $\left(\frac{25}{16}\right)^{-\frac{3}{2}}$.
- 5 Find the value of $\log_2 \sqrt{32}$.
- 6 If $\frac{3}{5}, k, \frac{13}{5}$ are in A.P find k.
- 7 Solve for x $\frac{x}{2} + \frac{2x}{3} = \frac{7}{2}$.
- 8 Find the simple interest on 1500 at 4% p.a. for 145 days.
- 9 Define annuity.
- 10 Convert 64% into decimal.
- 11 Express $\frac{5\pi^c}{3}$ in degrees.
- 12 Find the slope of the line joining the points (3,4) and (7, -6).

PART-B**II Answer any TEN questions****10 x 2 = 20**

- 13 Find the sum of all divisors of 156.
- 14 If $f(x) = 2x+1$, $g(x) = x^2+2x+1$ find $f \circ g(2)$ and $g \circ f(3)$.
- 15 If $A = \{x / x^2-5x+6=0, x \in \mathbb{N}\}$
 $B = \{x / x^2-7x+12=0, x \in \mathbb{N}\}$ find $(A - B) \times B$
- 16 Simplify $\left(\frac{a^x}{a^y}\right)^{x+y} \left(\frac{a^y}{a^z}\right)^{y+z} \left(\frac{a^z}{a^x}\right)^{z+x}$.
- 17 Which element of the G.P 5, 10, 20----- is 80?
- 18 Solve by formula method $2x(4x-1) = 15$.
- 19 Solve the inequality: $-15 < \frac{3(x-2)}{3} \leq 0$.
- 20 In how many years will a sum be double of itself at 10% C.I.
- 21 The average age of 10 boys in a class is 6 years. The sum of the ages of 9 boys is 52 find the age of 10th boy.
- 22 After revaluation a student marks was changed from 80 to 92. Find the percentage increased in marks.
- 23 Prove that $\cos^4 x - \sin^4 x = 1 - 2 \sin^2 x$.
- 24 Prove that the points (4, -2) (2, -4) and (7, 1) are collinear.
- 25 Find the equation of line passing through (-1, -2) and slope $\frac{4}{7}$.

PART-C**III Answer any TEN questions****10 x 3 = 30**

- 26 Find the HCF of $\frac{8}{9}, \frac{32}{81}, \frac{16}{27}$.
- 27 If $A = \{4,5,6,7,8\}$ $B = \{1,2,3,4\}$ $C = \{3,4,5,6\}$ prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- 28 If $x = r \cos A \cos B$, $y = r \cos A \sin B$ and $Z = r \sin A$ then prove that $x^2 + y^2 + z^2 = r^2$.
- 29 Prove that $X^{\log_y \log_z} \cdot Y^{\log_z \log_x} \cdot Z^{\log_x \log_y} = 1$.
- 30 If $\log_a(bc) = x$, $\log_b(ca) = y$ and $\log_c(ab) = z$ Show that $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = 1$.
- 31 The sum of 3 numbers in A.P is -18 and sum of their squares is 140 find the numbers.
- 32 Solve the inequality $3x + 4y \leq 12$, $2x + y \geq 6$ graphically.
- 33 If the interest on ₹800 be more than the interest on ₹400 by 40 in 2 years. Find the rate of interest.
- 34 The cost of a refrigerator is ₹27,000. If it depreciates at the rate of 8% find the value
- 35 A book seller bought 228 note books at an average price of ₹8.50 in which 80 books he bought at ₹7.50 each and 84 books at ₹10.50 each. Find the price of remaining books per unit.
- 36 A book seller sells a book at a profit of 10% if he had bought it at 4% less and sold it for ₹6 more, he would have gained $18\frac{3}{4}\%$. What did it cost him?
- 37 $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$ prove that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.
- 38 Find the equation of line passing through the intersection of the lines $3x + 2y - 5 = 0$, $4x - y - 3 = 0$ and parallel to $x + y + 7 = 0$.

PART-D**IV Answer any SIX questions****6 x 5 = 30**

- 39 In a college $\left(\frac{2}{5}\right)^{\text{th}}$ of the students play basket ball and $\left(\frac{3}{4}\right)^{\text{th}}$ play volleyball. If 50 students play none of these two games and 125 play both, use Venn diagram to find the number of students in the college.
- 40 Evaluate using log tables $\frac{12.567 \times 15.674}{0.5968 \times 19.78}$.
- 41 Find the sum of all numbers between 50 and 200 which are divisible by 11.
- 42 Find the integral roots between -3 and 3 by inspection and the using synthetic division solve the equation $x^3 + 2x^2 - 11x - 12 = 0$
- 43 The difference between compound interest and simple interest on a certain sum of money invested for 3 years at 6% p.a. is 110.16. Find the sum.
- 44 In how many years an annuity of ₹100 amounts to ₹3137.12 at 4.5% p.a. compound interest.
- 45 If $\sin \theta = \frac{-3}{5}$ and θ lies in IV quadrant then prove that $\frac{3 \tan \theta - 4 \cos \theta}{4 \tan \theta + 3 \cos \theta} = \frac{109}{12}$.
- 46 (a) Derive the equation of line in slope intercept form.
(b) Find the value of x if the distance between (x,3) and (4, 5) is 5 units.
- 47 Show that the points (8, 4) (4, 7) (-1, 1) and (2, -2) are the vertices of a rectangle.
- 48 Find the equation of medians of the triangles whose vertices are (-2, 3), (-1, 4) and (5, 0).

PART-E**V Answer any ONE question****1 x 10 = 10**

- 49 a Find K so that the lines $x - 6y + K = 0$, $2x + 3y + 4 = 0$ and $x + 4y + 1 = 0$ are concurrent. 4
- b Find x if $\frac{x \operatorname{cosec}^2 30 \sec^2 45}{8 \cos 45 \sin 60} = \tan^2 60 - \tan^2 30$. 4
- c The centroid of the triangle is (2,3). The co-ordinates are (5, 6) and (-1, 4) find the third co-ordinate. 2
- 50 a The daily cost of production C for x unit of an assembly is given by $C(x) = 17.5x + 7000$
- (i) If each unit is sold for ₹30. Then determine the minimum unit that should be produced and sold to ensure no loss.
- (ii) If the selling price is reduced by 3 units then what would be the BEP.
- (iii) If it is known that 500 units can be sold daily. What price / unit should be charged to guarantee no loss. 4

- b Find the sum of n terms of the G.P $0.3 + 0.33 + 0.333 + \dots$
- c Insert 3 A.M's between -2 and -10.

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