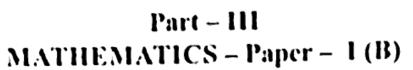


193

Total No. of Questions : 24

Total No. of Printed Pages : 2

Reg No.



(English Version)



Max. Marks: 75

Time: 3 Hours

Note: This question paper consists of THREE Sections - A, B and C.

SECTION - A

(10×2=20)

- I. Very short answer type questions.
 - (i) Attempt ALL questions.
 - (ii) Each question carries TWO marks.



- A) Find the distance between parallel lines 5x 3y 4 = 0 and 10x 6y 9 = 0.
- 2) Show that the points A(3, 2, -4), B(5, 4, -6) and C(9, 8, -10) are collinear.
- 3) Write the equation of plane 4x + 2z + 5 = 0 in intercepts form.
- 4) If the increase in side of squares 4%, then find the approximate percentage of increase in the area of square.
- $\sqrt{3}x + y$ 10 = 0 in to (i) slope-intercept form (ii) normal form.
 - -6) Find the second order derivative of $y = tan^{-1} \left(\frac{2x}{1-x^2} \right)$.
- Ty Find the derivative of e^{2x} .log $(3\frac{3}{3} + 4) \left(x > \frac{-4}{3}\right)$.
 - 8) Verity Rolle's theorem for the function $f(x) = x^2 1$ on [-1, 1].
 - 9) Compute $\lim_{x\to 2^+} ([x]+x)$ and $\lim_{x\to 2^+} ([x]+x)$. (1, 3)

10) Evaluate
$$\lim_{x\to 0} \left(\frac{3^x-1}{\sqrt{1+x-1}} \right)$$
.

(5×4=20)

- II. Short answer type questions.
 - (i) Attempt ANY FIVE questions.
 - (ii) Each question carries FOUR marks.
 - 11) If f, given by $f(x) =\begin{cases} k^2x k, & \exists x \ge 1 \\ 2, & \exists x < 1(-1, \ge 1) \end{cases}$ is a continuous function on R, then find values of k.

SECTION - B

- 12) Find the derivative of 'sec 3x' from the first principle.
- 13) The volume of a cube is increasing at the rate of 8 cm³/sec. How fast is the surface area increasing when the length of an edge is 12 cm?
- 14) Find the lengths of normal and sub-normal at a point on the curve

$$y = \frac{a}{2} \left(e^{x} a + e^{-x} a \right).$$

- 15) Find the equation of locus of 'P', if the ratio of distances from P to A(5, -4) and B(7, 6) is 2:3.
- **16)** When the axes are rotated through an angle $\frac{\pi}{4}$, find the transformed equation of $3x^2 + 10xy + 3y^2 = 9$.
- Find the point on the straight line 3x + y + 4 = 0 which is equidistant from the points (-5, 6) and (3, 2).



SECTION - C

(5×7=35)

- III. Long answer type questions.
 - (i) Attempt ANY FIVE questions.
 - (ii) Each question carries SEVEN marks.
 - 18) Find the orthocentre of triangle formed by the lines x + 2y = 0, 4x + 3y 5 = 0and 3x + y = 0. https://www.apboardonline.com
 - 19) Find the angle between the lines joining the origin to the points of intersection of the curve $x^2 + 2xy + y^2 + 2x + 2y - 5 = 0$ and the line 3x - y + 1 = 0.
 - 20) Show that the area of triangle formed by the lines ax2 + 2hxy + by2 = 0 and lx + my + n = 0 is $\left| \frac{n^2 \sqrt{h^2 - ab}}{am^2 - 2h/m + b/^2} \right|$
 - 21) Find the angle between the lines whose direction cosines are given by the equations 3l + m + 5n = 0 and 6mn - 2nl + 5lm = 0.
 - 22) If $x^y + y^x = a^b$, then show that $\frac{dy}{dx} = -\left(\frac{y_x x^{y-1} + y^x \cdot \log y}{y_y \cdot \log x + x \cdot y^{x-1}}\right)$.
 - 23) If the tangent at any point on the curve $x^{\frac{3}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ intersects the co-ordinate axes in A and B, then show that the length AB is a constant.
 - 24) The profit function P(x) of a company selling 'x' items per day is given by P(x) = (150 - x)x - 1000. Find the number of items that the company should manufacture to get maximum profit. Also find the maximum profit.