













# **NATIONAL SCHOLARSHIP TEST 2025-26**







Helpline Numbers: 9849 464 333, 9849 247 333, 9948 341 333

# MATHEMATICS, Paper – I (B) www.manabadi.co.i (English Version)

#### wTime: 3 Hours www.manabadi.co.in

www.manabadMax. Marks 175i.co.in

Note: This question paper consists of three sections A, B and C.

# SECTION - Avww.manabadi.co.in

Note: i) Answer all questions

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- www.manabadi ii) Each question carries two marks
- www.manabadi.iii) Allare very short answer type questions www.manabadi.co.in
  - 1. If the portion of the straight line intercepted between the axes is bisected at (2p,2q), discoin write the equation of the straight line.
- www.manabadi.co.in www.manabadi
- 3... Find the constant k so that the planes x = 2y + kz = 0 and 2x + 5y = z = 0 are at right angles. Find the equation of the plane through (1,-1,-1) and perpendicular to these planes.
  - 4. Verify whether the points A(2,-4,3), B(-4,5,6), C(4,-7,2) are collinear or not by using section formula.
- ww5...Evaluate  $L_{x\to 0}(\sqrt{x}+x^{5/2})(x>0)$
- www.manahadi.co.in  $t = \frac{1 \cos x}{x + 0} = 0$ .co.in
- 7. Find the derivative of the  $\frac{a + x}{a + x}$  w. r. t. x
- \*\* 8. If  $ay^{4} = (x+b)^{5}$  then show that  $5yy_{2} = y_{1}^{2}$  www.manabadi.co.in
- ww9:mFind the approximate value of  $\sqrt{82}$  w.manabadi.co.in
- www.manabadi.co.in www.manabadi

## www.<mark>SECTION.::- B</mark>www.manabadi.co.in

<u>II.</u> Note: i) Answer any **five** of the following questions.

 $5\times 4=20$ 

- ii) Each question carries **four** marks. manabadi.co.in iii) All are **short answer** type questions.
- 11. A(5,3), B(3,-2) are two points. If a point P forms a triangle of area 9 square unit with A,B then find the locus of P.

Line L has intercepts a and b on the axes of coordinates. When the axes are rotated 12. through a given angle, keeping the origin fixed, the same line L has intercepts p and q

manabadi co.in on the transformed axes. Prove that  $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$  www.manabadi.co.in www.manabadi.co.in

- adi.co.in x-5 if  $0 < x \le 1$  at the point 0, 1 and 2di.co.in  $0 < x \le 2$  if 1 < x < 2 www.manabadi.co.in  $0 < x \le 1$  www.manabadi.co.in  $0 < x \le 1$  www.manabadi.co.in  $0 < x \le 1$  www.manabadi.co.in www.manabadi.co.in w13. mcCheck the continuity of f given by  $\sqrt{f(x)}$
- 14. If  $x = \tan e^{-y}$  then show that  $\frac{dy}{dx} = \frac{\sqrt{u}e^{y} \cdot \text{manabadi.co.in}}{1+x^2 \cdot \text{manabadi.co.in}}$
- Suppose we have a rectangular aquarium with dimensions of length 8m, width 4m and www.maheight 3m. Suppose we are filling the tank with water at the rate of 0.4 cubic anabadi.co.in metre/sec. How fast is the height of water changing when the water level is 2.5 m?
- "16. Find the lengths of normal and subnormal to the curve  $y = \frac{a}{2}(e^{x/a} + e^{-x/a})$  at any point.
- 17. A container in the shape of an inverted cone has height 12 cm and radius 6 cm at the top. If it is filled with water at the rate of 12 cubic cm/sec., what is the rate of change www.min the height of water level when the tank is filled 8 cm?manabadi.co.in

## SECTION - C

- III. Note: i) Answer any five of the following questions. www.manabadi.co.in
- www.i**5**a**×7**oa<del>च</del>i.35.in

- www.mii) Each question carries seven marks.anabadi.co.in
- www.miii) All are long answer type questions. nabadi.co.in
- 18. Find the circum centre of the triangle formed by the lines.

$$3x - y - 5 = 0, x + 2y - 4 = 0, 5x + 3y + 1 = 0$$

w19. Find the product of the lengths of perpendicular drawn from (2,1) upon the lines addicated in

$$12x^2 + 35xy + 12y^2 + 10x + 11y + 2 = 0$$

- w20. Find the condition for the lines joining the origin to the points of intersection of the circle  $x^2 + y^2 = a^2$  and the line lx + my = 1, to coincide.
- 21. A line makes angles α, β, γ, δ with the four diagonals of a cube. Show that w. manabadi.co.in

$$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma + \cos^2 \delta = 4/3$$

- 22. Find the derivative of the following w.r.t.x Cos<sup>-1</sup>
- 23. The tangent at any point P on the curve  $x^m y^n = a^{m+n}$  cuts the coordinate axes in A and B. Show that AP: PB is constant.
  - 24. If  $y = x\sqrt{a^2 + x^2} + a^2 \log(x + \sqrt{a^2 + x^2})$  then show that  $\frac{dy}{dx} = 2\sqrt{a^2 + x^2}$



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