













NATIONAL SCHOLARSHIP TEST 2025-26







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

MATHEMATICS, Paper – I (A)

Note: This question paper consists of three sections

A, B, and C. die of the www.manabadi.co.in www.manabad

SECTION – A www.manabadi.co.in

www.m-Noted: i) Answer all questions

- www.manabadi.ii) Each question carries two marks adi.co.in
- www.manabadi iii) All are very short answer type questions
- 1. Find the domain and range of the function f(x) = |x| + |1+x|.

www.mIf $A : \{-2,-1,0,1,2\}$ and $f : A \rightarrow B$ vis a surjection defined by $f(x) = x^2 + x + 1$, then coin

2. find B.

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$$A = 0$$
, find $A = 0$, $A =$

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ABCDE is a pentagon. If the sum of the vectors \overrightarrow{AB} , \overrightarrow{AE} , \overrightarrow{BC} , \overrightarrow{DC} , \overrightarrow{ED} and \overrightarrow{AC} is

- $\lambda \overrightarrow{AC}$, then find the value of λ .
- 7. If $\cos \theta = t, 0 < t < 1$ and θ does not lie in the first quadrant, find the values of
- www.manabadi.co.in www.manabadi
- 8. Prove that $Tanh^{-1}$ $\begin{pmatrix} 1 \\ 2 \end{pmatrix} = \frac{1}{2} \log_e 3$ www.manabadi.co.in
- 9. Prove that $\frac{\sin 4\theta}{\sin \theta} = 8\cos^{2}\theta 4\cos^{2}\theta$
 - 10. If $f(x) = \frac{x-1}{x+1}$, $x \neq \pm 1$, show that $(f \circ f^{-1})(x) = x$.

SECTION - B

ww.II. Note: i) Answer any five of the following questions.ww.manabadi.co.in

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- www.mii) Each question carries four marks.manabadi.co.in
- www.miii) All are short answer type questions.abadi.co.in
- 11. A trust fund has to invert Rs. 30,000 in two different types of bonds. The bond pays 5% interest per year, and the second bond pays 7% interest per year. Using matrix multiplication, determin how to devide Rs.30,000 among the two types of bonds, if the trust fund must obtain an annual total interest of
 - (a) Rs 1,800 (b) Rs. 2,000
- 12. If a, b, c are non-coplanar vectors, then show that the four points 6a + 2b c, 2a b + 3c, -a + 2b 4c, -12a b 3c are coplanar.
- 13. If $0 < A < B < \frac{\pi}{4}$, $\sin(A+B) = \frac{24}{25}$, $\cos(A-B) = \frac{4}{5}$, find the value of tan 2A.
- 14. Solve $6 \tan^2 x 2 \cos^2 x = \cos 2x$
- 15. If A is not an integral multiple of π , prove that $\cos A \cos 2A \cos 4A \cos 8A = \frac{\sin(16A)}{16\sin A}$ and hence deduce that $\cos \frac{2\pi}{15} \cos \frac{4\pi}{15} \cos \frac{8\pi}{15} \cos \frac{16\pi}{15} = \frac{1}{16}$
- 16. If $Sin^{-1}x + Sin^{-1}y + Sin^{-1}z = \pi$, prove that $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$
- 17. In $\triangle ABC$, if $C = 90^{\circ}$ then prove that $\left(\frac{a^2 + b^2}{a^2 + b^2}\right) \sin (A B) = 1$.

SECTION in Cwww.manabadi.co.in

III. Note: i) Answer any five of the following questions.

 $5 \times 7 = 35$

- ii) Each question carries seven marks.
- ww.miii) All are long answer type questions.
- 18. If $f:A \to B$ is a bijection, then $f^{-1}_{W} \circ f = I_{A}$, $f \circ f^{-1} = I_{B}$ w. manabadi.co.in
- 19. Show that $49^n + 16n 1$ is divisible by 64.
- 20. Examine whether the systems of equation are consistent or inconsistent and if consistent find the complete solutions. x + y + z = 6, x y + z = 2, 2x y + 3z = 9

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22. In $\triangle ABC$ prove that

$$\sin\frac{A}{2} + \sin\frac{B}{2} + \sin\frac{C}{2} = 1 + 4\sin\left(\frac{\pi - A}{4}\right)\sin\left(\frac{\pi - B}{4}\right)\sin\left(\frac{\pi - C}{4}\right)$$

- 23. $\left(1 + \frac{3}{1}\right)\left(1 + \frac{5}{4}\right)\left(1 + \frac{7}{9}\right)...\left(1 + \frac{2n+1}{n^2}\right) = (n+1)^2$.
- 24. Prove that $\frac{r_1}{bc} + \frac{r_2}{ca} + \frac{r_3}{ab} = \frac{1}{r} \frac{1}{2R}$



MARCH di-c 2025 v. manabadi.co.in **Board of Intermediate Education** Mathematics I(A) www.masabadi.ed.i <u>www.manabadi.qime ww3v.Hpsabadi.co.in</u> www.matotalliMarks ww75nMnabadi.co.in www**SECTION** A www.manabadi.10x2=20Manabadi.co.in www.manalIndiAnswernallathe following questions n www.manaba1) $c_{0,in}$ Find the domain of definition of the function y(x), given by the abadico in equation $2^{x}+2^{y}=2$ www.manabadi.co.in If f: R \rightarrow R, g:R \rightarrow R are defined by f(x)=3x-1, g(x)= x^2+1 then find i) fog(2) ii) gof(2a-3) 0 is a skew symmetric matrix then find x. www.manabadi.co.in 2wv0man1dadi.co.in www.manabadi.co.f1 using elementary transformation. Find rank of A=134ww1mar2a 2... Find the vector equation of the plane passing through the point $i - 2j + 5\bar{k}, -5j - 5\bar{k}$ a n d 3i + 5j. A= 2i+5j+k and b=4i+mj+nk are collinear vectors then find m and n. If OA-i+j+k, AB=3i-2j+k, BC=i+2j-2k and Cd=2i+j+3k then find vector OD badi.co.in If $\frac{a + b + b}{a} = \frac{a + b}{b}$ then prove that $a\sin 2\alpha + b\cos 2\alpha = b$. 8) Draw the graph of y=sin x between $-\pi$ and π taking four values on X-axis. If Sinhx=3, prove that $x = log_e(3 + \sqrt{10})$. 10) SECTION - B II Answer any Five of the following questions 5x4=20Mdi.co.in www.manabadi.co.in 11) www.manabadi.co.in then show that A 12)_{co.in} If a, b, c are no-opd an arve, the onres rollaget the f $ourpo-ia\bar{t}s$ $4\overline{b} - 3c$, $3a + 2\overline{b} - 5c$, $-3a + 8\overline{b} - 5c$ are coplanar. 13) Prove that the angle in semi circle is right angle. Prove that $\frac{\tan \theta + \sec c}{\tan \theta - \sec c} \frac{\theta}{\theta} \frac{1 + \sin \theta}{\cot \theta}$ 14) Solve $4 \cdot \text{Cos}^2 \cdot \theta + \sqrt{3} = 2(\sqrt{3} + 1) \cdot \cos\theta$ www.manabadi.co.in www.manab**1**5i)co.in



Prove that $2 s i \pi^{\frac{13}{5}} = c o \pi^{\frac{15}{3}} = c o \pi^{\frac{23}{2} \frac{2}{3}}$ manabadico in www.manabadico in In Δ ABC prove that Cot A + cot B + cot $C = \frac{a^2 + b^2 + c^2}{a^2 + a^2 + b^2 + c^2}$ in www.manabadico in www.m
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