

# Aimstutorial Model Guess Paper-6

## MATHS - 1B

(Board of Intermediate Education Model Paper)

### SECTION - A

I. Answer ALL the following Very Short Answer Questions:

[10 x 2 = 20]

1. Find the slope of the line  $x+y=0$  and  $x-y=0$ .
2. Transform the equation  $x+y+1=0$  into Normal form.
3. If  $(3,2-1)$ ,  $(4,1,1)$  and  $(6,2,5)$  are three vertices and  $(4,2,2)$  is the centroid of a tetrahedron find the fourth vertex.
4. Find the angle between the planes  $2x-y+z=6$  and  $x+y+2z=7$
5. Evaluate  $\lim_{x \rightarrow 0} \frac{e^{7x} - 1}{x}$
6. Compute  $\lim_{x \rightarrow \infty} \frac{x^2 + 5x + 2}{2x^2 - 5x + 1}$
7. Find the derivative of  $5\sin x + e^x \log x$
8. Find the derivative of  $\sec^{-1}\left(\frac{1}{2x^2 - 1}\right)$ ,  $\left(0 < x < \frac{1}{\sqrt{2}}\right)$
9. Find  $\Delta y$  and  $dy$  of the function  $y = x^2 + x$ , for the values  $x=10$  and  $\Delta x=0.1$ .
10. Verify Rolle's theorem for the function  $y=f(x)=x^2+4$  on  $[-3, 3]$

### SECTION - B

II. Answer any FIVE of the following Short Answer Questions:

[5 x 4 = 20]

11.  $A(1,2)$ ,  $B(2,-3)$  and  $C(-2,3)$  are three points. A point  $P$  moves such that:  $PA^2 + PB^2 = 2PC^2$ . show that the equation to the locus of  $P$  is  $7x-7y+4=0$
12. When the axes are rotated through an angle  $\pi/4$ , Find the transformed equation of  $3x^2+10xy+3y^2=9$
13. Find the value of  $P$ , if the lines  $3x+4y=5$ ,  $2x+3y=4$ ,  $px+4y=6$  are concurrent

14. Check the continuity of the following function at 2.  $f(x) = f(x) = \begin{cases} \frac{1}{2}(x^2 - 4) & \text{if } 0 < x < 2 \\ 0 & \text{if } x = 2 \\ 2 - 8x^{-3} & \text{if } x > 2 \end{cases}$

15. Find the derivative of  $\cot x$  from the first principle.
16. A particle is moving in a straight line so that after  $t$  seconds its distance  $s$  (in cms) from a fixed point on the line is given by  $s=f(t)=8t+t^3$ . find (i) the velocity at time  $t=2$  sec (ii) The initial velocity (iii) acceleration at  $t = 2$  sec.
17. Find the equations of the tangent and normal to the curve  $xy=10$  at  $(2,5)$

**SECTION - C**

**III. Answer any FIVE of the following Long Answer Questions. :**

**[5 x 7 = 35]**

18. Find the circumcenter of the triangle whose vertices are (-2,3), (2,-1), (4,0)
19. Show that the area of the triangle formed by the lines  $ax^2+2hxy+by^2=0$  and  $lx+my+n=0$  is
- $$\frac{n^2\sqrt{h^2-ab}}{|am^2-2h/m+bl^2|}$$
20. Find the values of K, if the lines joining the origin to the points of intersection of the curve  $2x^2-2xy+3y^2+2x-y-1=0$  and the line  $x+2y=k$  are mutually perpendicular.
21. Find the angle between the lines whose d.c's are related by  $l+m+n=0$  &  $l^2+m^2+n^2=0$
22. Find the  $\frac{dy}{dx}$  of  $y=(\sin x)^{\log x}+x^{\sin x}$
23. Find the angle between the curves  $xy=2$  and  $x^2+4y=0$
24. A wire of length  $l$  is cut into two parts which are bent respectively in the form of a square and a circle. what are the lengths of pieces of wire so that the sum of areas is least?

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