

# Aimstutorial Model Guess paper-4

## MATHS - 1B

(Board of Intermediate Education Model Paper)

### SECTION - A

I. Answer ALL the following Very Short Answer Questions:

[10 x 2 = 20]

- Find the equation of the straight line perpendicular to the line  $5x-3y+1=0$  and passing through the point  $(4,-3)$
- Find the equation of the straight line passing through  $(-4,5)$  and cutting off equal intercepts on the coordinates axes.
- Show that the points  $(1,2,3)$ ,  $(2,3,1)$  and  $(3,1,2)$  form an equilateral triangle.
- Write the equation of the plane  $4x-4y+2z=0$  in the intercept form.
- Evaluate  $\lim_{x \rightarrow 0} \frac{e^x - 1}{\sqrt{1+x} - 1}$
- Evaluate  $\lim_{x \rightarrow 2} \left\{ \frac{1}{x-1} - \frac{4}{x^2-4} \right\}$
- Find the derivatives of  $7^{x^3} + 3x$ .
- If  $y=ax^{n+1}+bx^{-n}$  then show that  $x^2 \cdot y'' = n(n+1)y$ .
- If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.
- Verify Rolles' theorem for the function  $f(x)=x^2-5x+6$  in the interval  $[-3,8]$

### SECTION - B

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

[5 x 4 = 20]

- Find the equation of locus of a point p, if the distance of P from  $A(3,0)$  twice the distance of P from  $B(-3,0)$ .
- When the axes are rotated through an angle  $45^\circ$ , the transformed equation of a curve is  $17x^2-16xy+17y^2=225$ . find the original equation of the curve.
- Find the value of k if the angle between the straight lines  $4x-y+7=0$ ,  $kx-5y-9=0$  is  $45^\circ$
- If f is given by  $f(x) = \begin{cases} k^2 x - k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$  is a Continuous function on R, Then Find K.
- Find the derivative of  $\sin 2x$  from the first principles.
- The radius of a circle is increasing at the rate of 0.7 cm/sec/what is the rate of increase of its circumference.
- Find the value of k, so that the length of the subnormal at any point on the curve  $y=a^{1-k}x^k$  is a constant.

**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. Prove that the equation  $3x^2+7xy+2y^2+5x+5y+2=0$  represents a pair of straight lines and find the coordinates of the point of intersection.
20. 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  $3x-y+1=0$
21. Find the direction cosines of the two lines which are connected by the relations  $l-5m+3n=0, 7l^2+5m^2-3n^2=0$ .
22. If  $\sqrt{1-x} + \sqrt{1-y} = a(x-y)$  then prove that  $\frac{dy}{dx} = \frac{\sqrt{1-y}}{\sqrt{1-x}}$
23. If the tangent at a point on the curve  $x^{2/3}+y^{2/3}=a^{2/3}$  intersects the coordinate axes in A and B then show that the length AB is a constant.
24. Find the maximum area of the rectangle that can be formed with fixed perimeter 20 units.

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