Aimstutorial MODEL PAPER - 1

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 equation of the straight line passing through(-4, 5) and cutting off equal intercepts on the coordinating axes

2. Transform the equation 2x-3y+6=0 into Normal form

3. Find the distance between the mid point of the line segment $\overline{AB}$ and the point (3, -1,2) where A=(6,3,-4), B = (-2,-1,2)

4. Find the equation of the plane through(-1, 6,2) and perpendicular to the join of (1,2,3), (-2,3,4).

5. Compute $\underset{x\to 0}{Lt}\dfrac{3^x - 1}{\sqrt{1+x}-1}$

6. Find $\underset{x\to 0}{Lt}\dfrac{8|x|+3x}{3|x|-2x}$

7. Find the derivative of $Y = \dfrac{\sin(x+a)}{\cos x}$

8. If Y = cos (log(cot x)) then find $\dfrac{dy}{dx}$.

9. The diameter of a shere is measured to be 40 cm. If an error of 2.0 cm is made in it, then find approximate errors in volume and surface area of the sphere.

10. verify Lagrange's mean value theorem for the function f(x) = x^2 on [2, 4]

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** **[5 x 4 = 20]**

11. A(1,2), B(2,-3), C(-2,3) are 3 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 α, find the transformed equation of x cosα + Ysinα=P

13. A straight line through $Q\left(\sqrt{3},2\right)$ makes an angle $\pi/6$ with the positive direction of the X-axis. if the straight line intersects the line $\sqrt{3}$ x -4y+8=0 at P, find the distance PQ

14. Show that f(x) = sinx is continuous on R

15. Find the derivative of cosax from the first principle.

16. A stone is dropped into a quiet lake and ripples move in circles at the speed of 5 cm /sec. At the instant when the radius of circular ripple is 8 cm, how fast is the enclosed area increase?

17. Show that the curves $x^2+y^2=2$, $3x^2+y^2=4x$ have a common tangent at the point (1,1)

SECTION - C

III. **Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. Find the circumcentre of the triangle whose vertices are (1,3), (-3,5), (5,-1).
19. Find the centroid and area of the triangle formed by $2y^2 - xy - 6x^2 = 0$ and $x+y+4=0$
20. If the straight lines joining the origin with the points of intersecion of the curve $3x^2-xy+3y^2+2x-3y+4=0$ & the lines $2x +3y=k$ are perpendicular then prove that $6k^2-5k+52=0$
21. Find the direction cosines of two lines which are connected by the relations l+m+n, mn-2nl-2lm=0.

22. If $x^y + y^x = a^b$ the show that $\dfrac{dy}{dx} = -\left(\dfrac{yx^{y-1} + y^x \log y}{x^y \log x + xy^{x-1}} \right)$

23. Show that the curves $Y^2=4(x+1)$ and $Y^2=36(9-x)$ interested orthogonally.
24. From a rectangular sheet of dimensions 30cm x 80cm, from equal squares of sides x cm are removed at the corners and the sides are then turned up so as to form an open rectangular box. what is the value of x, so that the volume of the box is the greatest?

****