# Aimstutorial MODEL PAPER - 1 <br> MATHS - 1B <br> (Board of Intermediate Education Model Paper) 

## SECTION - A

I. Answer ALL the following Very Short Answer Questions:
[10 $\times 2=20]$

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 $2 x-3 y+6=0$ into Normal form
3. Find the distance between the mid point of the line segment $\overline{\mathrm{AB}}$ 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 $\operatorname{Ltt}_{x \rightarrow 0} \frac{3^{x}-1}{\sqrt{1+x}-1}$
6. Find $\underset{x \rightarrow 0}{\operatorname{Lt}} \frac{8|x|+3 x}{3|x|-2 x}$
7. Find the derivative of $Y=\frac{\sin (x+a)}{\cos x}$
8. If $Y=\cos (\log (\cot x))$ then find $\frac{d y}{d x}$.
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:
11. $A(1,2), B(2,-3), C(-2,3)$ are 3 points. A point $P$ moves such that $P A^{2}+P B^{2}=2 P C^{2}$. show that the equation to the locus of $P$ is $7 x-7 y+4=0$.
12. When the axes are rotated through an angle $\alpha$, find the transformed equation of $x \cos \alpha+Y \sin \alpha=P$
13. A straight line through $Q(\sqrt{3}, 2)$ makes an angle $\pi / 6$ with the positive direction of the $X$-axis. if the straight line intersects the line $\sqrt{3} x-4 y+8=0$ at $P$, find the distance $P Q$
14. Show that $f(x)=\sin x$ 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 $5 \mathrm{~cm} / \mathrm{sec}$. At the instant when the radius of circular ripple is 8 cm , how fast is the enclosed area increase?
17. Show that the curves $x^{2}+y^{2}=2,3 x^{2}+y^{2}=4 x$ have a common tangent at the point $(1,1)$
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 $2 y^{2}-x y-6 x^{2}=0$ and $x+y+4=0$
20. If the straight lines joining the origin with the points of intersecion of the curve $3 x^{2}-x y+3 y^{2}+2 x-3 y+4=0$ \& the lines $2 x+3 y=k$ are perpendicular then prove that $6 k^{2}-5 k+52=0$
21. Find the direction cosines of two lines which are connected by the relations $1+m+n, m n-2 n l-2 I m=0$.
22. If $x^{y}+y^{x}=a^{b}$ the show that $\frac{d y}{d x}=-\left(\frac{y x^{y-1}+y^{x} \log y}{x^{y} \log x+x y^{x-1}}\right)$
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 $30 \mathrm{~cm} \times 80 \mathrm{~cm}$, from equal squares of sides $\times \mathrm{cm}$ 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?

