## Aimstutorial Model guess paper-3

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

## SECTION - A

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

1. Transform the equation $\sqrt{3} x+y=4$ in to (i) slope intercept form (ii) Intercept form
2. Find the value of $P$ if the straight lines $3 x+7 y-1=0$ and $7 x-p y+3=0$ are mutually perpendicular.
3. Show that the points $(1,2,3),(7,0,1),(-2,3,4)$ are collinear.
4. Reduce the equation $x+2 y-3 z-6=0$ of the plane to the normal form.
5. Compute the limit of $\underset{x \rightarrow 3}{\operatorname{Lt}} \frac{x^{2}-8 x+15}{x^{2}-9}$
6. Evaluate $\underset{x \rightarrow 0}{\operatorname{Lt}} \frac{e^{x}-\sin x-1}{x}$
7. Find the derivative of $\sin -1\left(3 x-4 x^{3}\right)$ with respect of ' $x$ '
8. If $2 x^{2}-3 x y+y^{2}+x+2 y-8=0$ then find $\frac{d y}{d x}$.
9. Find dy and $\Delta y$ of $y=f(x)=x^{2}+x$ at $x=10$ when $\Delta x=0.1$
10. Find the length of subtangent at a point on the curve $\mathrm{y}=\mathrm{b} \sin \left(\frac{x}{a}\right)$

## SECTION - B

II. Answer any FIVE of the following Short Answer Questions:
11. Find the equation of locus of a point, the sum of whose distance from $(0,2)$ and $(0,-2)$ is 6 .
12. When the origin is shifted to the point $(2,3)$ the transformed equation of a curve is $x^{2}+3 x y-2 y^{2}+17 x-7 y-$ $11=0$. Find the original equation of curve.
13. Find the equation of the straight line parallel to the line $3 x+4 y=7$ and passing through the point of intersection of the lines $x-2 y-3=0, x+3 y-6=0$.
14. Check the continuity of ' $f$ ' given by $f(x)=\left\{\begin{array}{ll}4-x^{2} & \text { if } x \leq 0 \\ x-5 & \text { if } 0<x \leq 1 \\ 4 x^{2}-9 & \text { if } 1<x<2 \\ 3 x+4 & \text { if } x \geq 2\end{array}\right.$ at points $x=0,1,2$
15. $\mathrm{X}=\mathrm{a}(\cos \mathrm{t}+\sin \mathrm{t}), \mathrm{y}=\mathrm{a}(\sin \mathrm{t}-\mathrm{t} \operatorname{cost} \mathrm{t})$ find $\frac{d y}{d x}$.
16. Find the equation of tangent and normal to the curve $y=2 . e^{\frac{-x}{3}}$ at the point where the curve meets the $Y$ - axis.
17. A point $P$ is moving on the curve $y=2 x^{2}$. The $x$ coordinates of $P$ is increasing at the rate of 4 units per second. Find the rate at which y co-ordinates is uncreasing when the point is at $(2,8)$.

## SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :
18. The base of an equilateral traingle is $x+y-2=0$ and opposite vertex is $(2,-1)$ Find the equation of the remaining sides.
19. If the second degree equation $S \equiv a x^{2}+2 h x y+b y^{2}+2 g x+2 f y+c=0$ in two variables $x$ and $y$ represents a pair of straight lines, then prove that. (a) abc $+2 f g h-a f^{2}-b^{2}-c h 2=0 \quad$ (b) $h^{2} \geq a b, f^{2} \geq b c, g^{2} \geq a c$.
20. Find the lines joining the origin with the points of intersection of the curv $7 x^{2}-4 x y+8 y^{2}+2 x-4 y-8=0$ with the straight line $3 x-y=2$ and also the angle between them.
21. Find the direction cosines of the two lines which are connected by the relations $l-5 m+3 n=0$, $\left.7\right|^{2}+5 m^{2}-3 n^{2}=0$.
22. If $x^{y}+y^{x}=a^{b}$ then prove 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. If the curved surface of right circular cylinder inscrided in a sphere of radius ' $r$ ' is maximum, show that the height of the cylinder is $\sqrt{2} \mathrm{r}$.
24. If $a x^{2}+b y^{2}=1, a_{1} x^{2}+b_{1} y^{2}=1$, then show that the condition for orthogonality of above curves is $\frac{1}{a}-\frac{1}{b}=\frac{1}{a_{1}}-\frac{1}{b_{1}}$

