## **Aimstutorial MODEL PAPER - 5**

## MATHS - 1A

**SECTION - A** Ι. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20] 1. If f : Q $\rightarrow$ Q is defined by f(x) = 5x + 4, find f<sup>-1</sup>. Find the domain of the real function  $f(x) = \frac{1}{\sqrt{1-x^2}}$ . 2. Find the trace of  $\begin{bmatrix} 1 & 3 & 5 \\ 2 & -1 & 5 \\ 2 & 0 & 1 \end{bmatrix}$ . 3. If  $\begin{bmatrix} 0 & 2 & 1 \\ -2 & -0 & -2 \\ 1 & x & 0 \end{bmatrix}$  is a skew symmetric matrix then find the value of x. 4. If  $\alpha$ ,  $\beta$  and  $\gamma$  be the angle made by the vector  $3\overline{i} - 6\overline{j} + 2\overline{k}$  with the positive directions of the 5. coordinate axes, then find  $\cos\alpha$ ,  $\cos\beta$  and  $\cos\gamma$ . Find the vector equation of the line passing through the points  $2\overline{i} + \overline{j} + 3\overline{k}$ ,  $-4\overline{i} + 3\overline{j} - \overline{k}$ . 6. If  $\overline{a} = \overline{i} + 2\overline{j} - 3\overline{k}$   $\overline{b} = 3\overline{i} - \overline{j} + 2\overline{k}$  then show that  $\overline{a} + \overline{b}$ ,  $\overline{a} - \overline{b}$  are perpendicular. 7. Prove that  $\frac{\cos 9^{\circ} + \sin 9^{\circ}}{\cos 9^{\circ} - \sin 9^{\circ}} = \cot 36^{\circ}.$ 8. Find the period of  $f(x) = \cos\left(\frac{4x+9}{5}\right)$  interval. If  $\sinh x = \frac{3}{4}$  then find  $\cosh 2x$  and  $\sinh 2x$ . 9. 10. **SECTION - B** Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20] н. If  $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$  then show that  $A^{-1} = A^3$ . 11. If the points whose postion vecotrs are  $3\overline{i} - 2\overline{j} - \overline{k}$ ,  $2\overline{i} + 3\overline{j} - 4\overline{k}$ ,  $\overline{i} + \overline{j} + 2\overline{k}$ ,  $4\overline{i} + 5\overline{j} + \lambda\overline{k}$  are 12. coplanar, then show that  $\lambda = \frac{146}{17}$ . 13. Find the area of the triangle formed with the points A(1,2,3), B(2,3,1), C(3,1,2). Show that  $\sin A = \frac{\sin 3A}{1 + 2\cos 2A}$ . Hence find the value of  $\sin 15^\circ$ . 14. 15. Solve  $\sin\theta + \sin 5\theta - \sin 3\theta$ ,  $0 < \theta < \pi$ . 16. Prove that  $\operatorname{Tan}^{-1}\frac{1}{2} + \operatorname{Tan}^{-1}\frac{1}{5} + \operatorname{Tan}^{-1}\frac{1}{8} = \frac{\pi}{4}$ . 17. If  $\cot \frac{A}{2} : \cot \frac{B}{2} : \cot \frac{C}{2} = 3 : 5 : 7$  then show that a:b:c = 6:5:4.

## **SECTION - C**

