



THE AMERICAN COLLEGE, MADURAI

AN AUTONOMOUS INSTITUTION AFFILIATED TO MADURAI KAMARAJ UNIVERSITY)

Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

Course : Analytical Geometry - 3 D

Marks: 75

Course Code: MAT / MAS 1411

Time: 3 hrs

Answer any 5 out of 7 :

(5 X 15 = 75)

1. Show that the straight lines whose direction cosines are given $al + bm + cn = 0$;

$fmn + gnl + hlm = 0$ are perpendicular if $\frac{f}{a} + \frac{g}{b} + \frac{h}{c} = 0$ and

parallel if $\sqrt{af} + \sqrt{bg} + \sqrt{ch} = 0$.

2. Show that the origin lies in the acute angle between the planes $x + 2y + 2z = 9$;

$4x - 3y + 12z + 13 = 0$. Find the planes bisecting the angles between them and point out which bisects the obtuse angle .

3. Prove that the lines $\frac{x+1}{-3} = \frac{y+10}{8} = \frac{z-1}{2}$; $\frac{x+3}{-4} = \frac{y+1}{7} = \frac{z-4}{1}$ are coplanar. Find also their

Point of intersection and plane through them.

4. Prove that the Shortest Distance between the lines

$ax + by + cz + d = 0 = a_1x + b_1y + c_1z + d_1$ and

$ax + \beta y + \gamma z + \delta = 0 = \alpha_1x + \beta_1y + \gamma_1z + \delta_1$ is

$$\begin{vmatrix} a & b & c & d \\ a_1 & b_1 & c_1 & d_1 \\ \alpha & \beta & \gamma & \delta \\ \alpha_1 & \beta_1 & \gamma_1 & \delta_1 \end{vmatrix} \div \{ \sum (BC' - B'C)^2 \}^{1/2}$$

5. Find the equation of the sphere which passes through the circle

$$x^2 + y^2 + z^2 - 2x - 4y = 0 ; x + 2y + 3z = 8 \text{ and touches the plane } 4x + 3y = 2$$

6. Find the condition for the equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2fxy = 0$ to represent a right circular cone. Obtain the equation of the axis and the vertical angle of the cone.

7. Find the equation of the right circular cylinder described on the circle through the points $(a, 0, 0) ; (0, a, 0) \& (0, 0, a)$ as a guiding curve.
