SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - III
20UMACT3006 - Three Dimensional Geometry

Total Duration : 2 Hrs 30 Mins. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. (i) Find the angle between the planes 6x-3y-2z=7 and x+2y+2z+9=0.
   (ii) Find the equation of the plane that passes through (3,-2,4) and is perpendicular to the line joining the points (2,3,5) and (1,-2,3).
2. A cube has edges of length a. Find the distance between a diagonal and an edge skew to it.
3. Determine the symmetrical form of the equations of the line of intersection of the planes x+5y-z-7=0; 2x-5y+3z+1=0.
4. Solve the equation of the sphere having the circle $x^2+y^2+z^2$-2x+4y-6z+7=0; 2x-y+2z=5 for a great circle.
5. Discuss the equation of the spheres which passes through the circle $x^2+y^2+z^2$-2x-4y=0, x+2y+3z=8 and touches the plane 4x+3y=25.
6. Deduce the equation of the cone of the second degree which passes through the axes.
7. Find the equation of the right circular cylinder of radius 3 with axis $\frac{x+2}{3} = \frac{y-4}{6} = \frac{z-1}{2}$
8. Derive the equation of the cylinder whose generators are parallel to the line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$ and whose guiding curve is f(x,y,z) = 0; ax + by + cz + d = 0.

Section B

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Find the equation of the plane passing through the points (2,-5,-3) (2,-3,5) and (5, 3,–3).
10. Prove that the lines $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ and $\frac{x-2}{1} = \frac{y-4}{3} = \frac{z-3}{3}$ intersect and find the point of intersection.

Contd...

11. Examine that the plane 2x - y - 2z = 16 touches the sphere $x^2 + y^2 + z^2$ - 4x + 2y + 2z - 3 = 0 and find the point of contact.

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

13. Solve 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.

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