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.Mathematics - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - III
20UMACT3006 - Three Dimensional Geometry

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

Section B

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

1. Find the equation of the plane through the point (-1,3,2) and perpendicular to the two planes $x + 2y + 2z = 5$, $3x + 3y + 2z = 8$.

2. Prove that the lines $\dfrac{x+1}{-3} = \dfrac{y+10}{8} = \dfrac{z-1}{2}$ and $\dfrac{x+3}{-4} = \dfrac{y+1}{7} = \dfrac{z-4}{1}$ are coplanar.

3. Find the equation of the sphere which passes through the points (0,0,0), (1,0,0), (0,1,0) and (0,0,1).

4. Show that the equation of right circular cone whose vertex is O, axis OZ and semi vertical angle α is $x^2 + y^2 = z^2 \, tan^2\alpha$.

5. Find the equation of cylinder whose generators are parallel to z axis and the guiding curve is $ax^2 + by^2 = cz$, $lx + my + nz = p$.

6. Find the equation of the plane passes through the points (2, -5, -3), (-2,-3, 5) and (5, 3,-3).

7. Find the image of the point (1,-2, 3) in the plane $2x - 3y + 2z + 3 = 0$.

8. Find the equation of the sphere which touches the sphere $x^2 + y^2 + z^2 - 6x + 2z + 1 = 0$ at the point (2,-2,1) and passes through the origin.

Section C

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

9. Show that the origin lies in the acute angle between the planes $x + 2y + 2z = 0$ $4x - 3y = 12z + 13 = 0$. Find the plane bisecting the angle between them and point out which bisects the abduce angle.

10. Find the shortest distance and the equation of the line of shortest distance between the lines $\dfrac{x+7}{3} = \dfrac{y+4}{4} = \dfrac{z+3}{-2}$ and $\dfrac{x-21}{6} = \dfrac{y+5}{-4} = \dfrac{z-2}{-1}$.

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11. Find the equation of the sphere which passes through the circle $x^2 + y^2 + z^2 = 5$, $x + 2y + 3z = 5$ and touches the plane $4x + 3y = 15$.

12. Find the equation of the cone whose vertex is $(1,2,3)$ and which passes through the circle $x^2 + y^2 + z^2 = 4$, $x + y + z = 1$.

13. Find the equation of the right circular cylinder of radius 3 with axis $\dfrac{x+2}{3} = \dfrac{y-4}{6} = \dfrac{z-1}{2}$.

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