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.(Maths) END SEMESTER EXAMINATIONS NOVEMBER -2023
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 passing through the points (-1,1,1) and (1,-1,1) and perpendicular to the plane $x + 2y + 2z - 5 = 0$.
2. Find the distance between the parallel planes $2x - 2y + z + 3 = 0$ and $4x - 4y + 2z + 5 = 0$
3. Find the perpendicular distance from the point (2,4,-1) to the line $\frac{x+5}{1} = \frac{y+3}{4} = \frac{z-6}{-9}$.
4. Prove that the lines $\frac{x+3}{2} = \frac{y+5}{3} = \frac{z-7}{-3}$ and $\frac{x+1}{4} = \frac{y+1}{5} = \frac{z+1}{-1}$ are coplanar. Also find the equation of the plane containing them.
5. Find the centre and radius of the sphere $2x^2 + 2y^2 + 2z^2$ - $2x + 4y$ - $6z = 1$.
6. Find the equation of the sphere on the line joining the points (2,-3,1) and (1,-2,-1) as the ends of a diameter.
7. Find the equation to the quadric cone which passes through the three coordinate axes and three mutually perpendicular lines $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}, \frac{x}{1} = \frac{y}{-1} = \frac{z}{-1}, \frac{x}{5} = \frac{y}{4} = \frac{z}{1}$.
8. Find the equation of the right circular cylinder of radius 3 with axis as $\frac{x-1}{2} = \frac{y-3}{2} = \frac{z-5}{-1}$.

Section C

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

9. Find the equation of the plane which passes through the line of intersection of the plane $2x + 3y + 10z - 8 = 0$, $2x - 3y + 7z - 2 = 0$ and is perpendicular to the plane $3x - 2y + 4z - 5 = 0$.

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10. Find the shortest distance between the lines $\frac{x-3}{-3} = \frac{y-8}{1} = \frac{z-3}{-1}$ and $\frac{x+3}{3} = \frac{y+7}{-2} = \frac{z-6}{-4}$.
11. Find the centre and radius of the circle $x^2 + y^2 + z^2 - 2y - 4z + 1 = 0$, $x + 2y + 2z = 11$.
12. Find the equation of the right circular cone whose vertex is (3,2,1), semi-vertical angle is 30° and axis is the line $\frac{x-3}{4} = \frac{y-2}{1} = \frac{z-1}{3}$.
13. Find the equation of the right circular cylinder which passes through the circle $x^2 + y^2 + z^2 = 9$, $x - y + z = 3$.

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