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 APRIL-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 passes through the points
(2, 2, -1), (3,4,2) and (7,0,6).

2. Put in the symmetrical form the line $3x$ - $2y$ $+z$ - $1 = 0 = 5x + 4y$ - $6z$ - 2

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

7. 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.

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. Find the image of the point (2, 3, 5) in the plane 2x + y − z + 2 = 0.

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 $\dfrac{x-21}{6} = \dfrac{y+5}{-4} = \dfrac{z-2}{-1}$.

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
$$\frac{x+2}{3} = \frac{y-4}{6} = \frac{z-1}{2}$$

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