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 EXAMINATION APRIL/NOV – 2021
SEMESTER - III

20UMACT3006 - Three Dimensional Geometry

Total Duration	**: 3 Hrs**	**Total Marks**	**: 75**
MCQ	: 30 Mins	MCQ	: 15
Descriptive	: 2 Hrs.30 Mins	Descriptive	: 60

Section B

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

1. Find the angle between the planes $2x - y + z = 6$ and $x + y + 2z = 3$.

2. Find the equation of the line parallel to the line of intersection of the planes $x + 5y - z - 7 = 0$ and $2x - 5y + 3z + 17 = 0$ and passing through the point $(1,2,3)$.

3. Prove that the line $\frac{x-3}{2} = \frac{y-4}{3} = \frac{z-5}{4}$ is parallel to the plane $4x + 4y - 5z = 0$.

4. Find the equation to the sphere passes through the four points $(0,0,0)$, $(a,0,0)$, $(0,b,0)$, $(0,0,c)$.

5. Find the equation of the tangent planes of the sphere $x^2 + y^2 + z^2 - 4x - 4y - 4z + 10 = 0$ which are parallel to the plane $x - z = 0$

6. Obtain the equation of the right circular cone whose axis is z axis and the semi vertical angle is α.

7. Find the equation of the cylinder whose guiding curve is $ax^2 + 2hxy + by^2 = 1,\ z = 0$ and whose generators are parallel to the line $\frac{x}{\lambda} = \frac{y}{\mu} = \frac{z}{\nu}$

8. Find the equation of the cone whose vertex is the point $(1,1,0)$ and whose guiding curve is $x^2 + y^2 = 4,\ y = 0$

Contd…

Section C

Answer any ***THREE*** questions (3 × 10 = 30 Marks)

9. Find the bisectors of the angles between the planes $2x - y + z + 3 = 0$, $3x - 2y + 6z + 8 = 0$; also find out which plane bisects the acute angle.

10. Find the shortest distance between the lines $\frac{x-8}{2} = \frac{y+9}{-16} = \frac{z-10}{7}$ and $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-15}{-5}$.

11. Find the equation of the sphere which has the circle $x^2 + y^2 + z^2 + 2x + 4y + 6z - 11 = 0, 2x + y + 2z + 1 = 0$ as a great circle.

12. Prove that the equation $2x^2 + 2y^2 + 7z^2 - 10yz - 10zx + 2x + 2y + 26z - 17 = 0$ represents a cone whose vertex is (2, 2, 1).

13. Find the equation of the right circular cylinder whose radius is 2 and whose axis passes through the point (1,2,3) and has direction ratios 2, -3, 6.