B.Sc DEGREE EXAMINATION,APRIL 2019
II Year III Semester
Threee Dimensional Geometry

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Find the equation to the plane through (3, 4, 5) parallel to the plane $2x + 3y - z = 0$.

2. Find the equation of the straight line joining the points (2, 5, 8) and (-1, 6, 3).

3. Find the equation of the Sphere with centre (-1, 2,-3) and radius 3 units.

4. Find the equation of the Sphere which has its centre at the point (6,-1, 2) and touches the plane 2x - y + 2z -2 =0.

5. Define Cone?

6. Write the angle between the lines in which the plane ux + vy + wz = 0 cuts the cone.

7. What is meant by a Right Circular Cone?

8. Show that the equation of a Right Circular Cone whose vertex is O, axis OZ and Semi-vertical angle α is $x^2 + y^2 = z^2 tan^2 \alpha$

9. Write the definition of Cylinder.

10. Write the equation of a plane in the intercept form.

11. Find the distance of the origin from the plane 6x - 3y + 2z - 14 = 0.

12. Define Sphere.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Find the equations of the orthogonal projection of the line $\dfrac{x - 2}{4} = \dfrac{y - 1}{2} = \dfrac{z - 4}{3}$ onto the plane $8x + 2y + 9z = 0$.

14. Show 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.

15. Find the general equation to a cone which touches the co-ordinate planes.

16. Find the equation of the cone with vertex O and base curve, the conic in which the surface $ax^2 + by^2 + cz^2 = 1$ is cut by the plane $l_1 x + m_1 y + n_1 z = p$.

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

18. Find the equation of the plane passing through the points (3, 1, 2), (3, 4, 4) and perpendicular to the plane 5x +y +4z = 0.

19. Find the equation to the sphere through the four points (2, 3, 1), (5, -1, 2), (4, 3, -1) and (2, 5, 3).

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Find the shortest distance between the lines $\dfrac{x-3}{-1} = \dfrac{y-4}{2} = \dfrac{z+2}{1}$; $\dfrac{x-1}{1} = \dfrac{y+7}{3} = \dfrac{z+2}{2}$.

21. A plane passes through a fixed point (a, b, c) and cuts the axes in A,B,C. Show that the locus of the centre of the sphere OABC is $\dfrac{a}{x} + \dfrac{b}{y} + \dfrac{c}{z} = 2$.

22. Find the equations of the tangent planes to the cone $9x^2 - 4y^2 + 16z^2 = 0$ which contain the line $\dfrac{x}{32} = \dfrac{y}{72} = \dfrac{z}{72}$.

23. Find the equation of the enveloping cylinder of the surface $ax^2 + by^2 + cz^2 = 1$ having the generator parallel to $\dfrac{x}{l} = \dfrac{y}{m} = \dfrac{z}{n}$.

24. Find 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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