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

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

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

Answer any **TEN** questions

1. Find the angle between the planes 2x - y + z = 6, x + y + 2z = 3.
2. Find the distance between the parallel planes 2x - 2y -z + 3 = 0 and 4x - 4y + 2z + 5 = 0.
3. Find the point where the line $\frac{x-2}{2} = \frac{y-4}{-3} = \frac{z+6}{4}$ meets the plane 2x + 4y - z - 2 = 0.
4. Write the equation of a straight line passing through two given points?
5. Find the co-ordinates of the centre and radius of the sphere $2x^2 + 2y^2 + 2z^2 - 2x + 4y + 2z - 15 = 0$
6. Define great circle?
7. Write the condition that the cone has three mutually perpendicular generators.
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 right circular cylinder.
10. Define axis of the cylinder?
11. Write the equation of a sphere passing through a given circle?
12. Define length of perpendicular from origin to the plane?

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

Answer any **FIVE** questions

13. Find the equation of the plane through the line of intersection of the planes x + y + z = 1, 2x + 3y + 4z -7 = 0 and perpendicular to the plane x - 5y + 3z = 5.
14. Find the perpendicular distance from P(3 , 9 , -1) to the line $\frac{x+8}{-8} = \frac{y-31}{1} = \frac{z-13}{4}$.
15. Find the equation of the sphere having the circle $x^2+y^2+z^2-2x+4y-6z+7 = 0$, $2x - y + 2z = 5$ for a great circle.

16. Write the intersection of a straight line and a quadric cone in detail.
17. Find the equation of the cylinder whose generators are parallel to the z axis and the guiding curve is $ax^2 + by^2 = cz$, $lx + my + nz = p$.
18. Find the equation of the plane passing through the points (2 , -5 , -3) , (-2 , -3 , 5) and (5 , 3 , -3).
19. Find the equations of the image of the line $\frac{x-1}{2} = \frac{y+2}{-5} = \frac{z-3}{2}$ in the plane 2x - 3y + 2z + 3 = 0.

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

Answer any **THREE** questions

20. Show that the origin lies in the acute angle between the planes x + 2y + 2z = 0, 4x – 3y + 12z + 13 = 0. Find the planes bisecting the angles between them and point out which bisects the obtuse angle.
21. Prove that the lines $\frac{x+1}{-3} = \frac{y+10}{8} = \frac{z-1}{2}$; $\frac{x+3}{-4} = \frac{y+1}{7}$, $\frac{z-4}{1}$ are coplanar. Find also their point of intersection and the plane through them.
22. A sphere of constant radius k passes through the origin and meets the axes in A, B, C. Prove that the centroid of the triangle ABC lies on the sphere $9(x^2 + y^2 + z^2) = 4k^2$.
23. Find the condition for the equation
    $F(x, y, z) = ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy + 2ux + 2vy + 2wz + d = 0$
    to represent a cone.
24. Write the equation of the right circular cylinder with axis $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$ and radius of the guiding circle λ in detail.

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