B.Sc. DEGREE EXAMINATION,NOVEMBER 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 equation of the plane through (3,4,5) and parallel to the plane 2x +3y-z=0.
2. Write down the normal form of a plane.
3. Find the equation of the line joining the points (2,1,3), (1,-2,4).
4. State the equation of a straight line in symmetric form.
5. Define sphere.
6. Find the equation of the sphere with centre (-1,2,-3) and radius 3 units.
7. Define right circular cone.
8. Find the angle between the equation of the axis of a cone $\frac{x}{p} = \frac{y}{q} = \frac{z}{r}$ and one of the generators of the cone $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$.
9. Define cylinder.
10. What is right circular cylinder?.
11. Find the angle between the planes 2x-y+z=6, x+y+2z = 3.
12. Find the centre and radius of a the sphere $2x^2 + 2y^2 + 2z^2$-2x+2y-4z -5 = 0.

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

Answer any **FIVE** questions

13. 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.
14. Find the shortest distance between the lines $\frac{x-3}{-1} = \frac{y-4}{2} = \frac{z+2}{1}$; $\frac{x-1}{1} = \frac{y+7}{3} = \frac{z+2}{2}$.
15. 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.
16. Show that the equation of a right circular cone whose vertex is O , axis OZ and semi vertical angle α is $x^2+y^2=z^2\tan^2 \alpha$.

17. Find the equation of a right circular cylinder of radius 3 with axis $\frac{x+2}{3} = \frac{y-4}{6} = \frac{z-1}{2}$.
18. Find the equation of the plane through the intersection of the planes 3x-y+2z – 4 = 0 and x+y+z-2=0 and passing through the points (2,2,1).
19. Find the point at which the line $\frac{x-1}{2} = \frac{y-2}{-3} = \frac{z+3}{4}$ meets the plane 2x + 4y – z + 1 = 0.

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

Answer any **THREE** questions

20. Find the equation of the plane passing through the points (2,-5,-3), (-2,-3,5) and (5,3,-3) .
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. Find the equation of the sphere through the four points (2,3,1), (5,-1,2), (4,3,-1) and (2,5,3).
23. Find the equation to the right circular cone whose vertex is at the origin, whose axis is the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and which has the semi vertical angle of 30°.
24. Find the equation of the right circular cylinder whose guiding curve is the circle $x^2+y^2+z^2=4$, x + y+z=2.

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