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Reg.No.

S.No. 406 BATCH: 87 to 2012,2015

END OF SEMESTER EXAMINATIONS, APRIL / MAY 2017
ANALYTICAL GEOMETRY
SUBJECT CODE: 15UAMA07

MAJOR: B.Sc. MATHS SEMESTER : IV
TIME : 3 HOURS MAX.MARKS: 75

SECTION – A (5 X 2 = 10)

Answer ALL Questions:

1. Define polar coordinates of a point.

(OR)

2. Write down the distance between the points (r_1 , θ_1) and (r_2, θ_2).

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

(OR)

4. Define coplanar lines.

5. Find the radius and the centre of the sphere $2x^2 + 2y^2 + 2z^2 - 2x + 4y + 2z - 15 = 0$.

(OR)

6. Find the equation of the sphere whose centre is the origin and which passes through (2 , 2 , 1).

7. Define a right circular cone.

(OR)

8. Write down the condition for the equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2fxy = 0$ to represent a right circular cone.

9. Define a cylinder.

(OR)

10. Define a right circular cylinder.

SECTION – B (5 X 4 = 20)

Answer ALL Questions:

11. Find the area of a triangle when the polar co-ordinates of the angular points are known.

(OR)

12. Derive the equation of a straight line in polar coordinates.

13. Find the point where the line $\frac{x-2}{2}=\frac{y-4}{-3}=\frac{z+6}{4}$ meets the plane $2x + 4y - z - 2 = 0$.

(OR)

14. Find the condition for the line $\frac{x-x_1}{\ell}=\frac{y-y_1}{m}=\frac{z-z_1}{n}$ to be parallel to the plane $ax + by + cz + d = 0$.

15. Prove that the plane section of a sphere is a circle.

(OR)

16. Prove that the intersection of two spheres is a circle.

17. Find the condition for the general homogeneous equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy = 0$ to represent a cone.

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(OR)

18. Show that the equation of a right circular cone whose vertex is 0, axis oz and semi-vertical angle 'α' is $x^2+y^2= z^2\tan^2\alpha$.

19. Find the equation of a right circular cylinder of radius 3 and axis $\frac{x-1}{2}=\frac{y-3}{2}=\frac{z-5}{-1}$.

(OR)

20. Find the equation of a right circular cylinder of radius 2, whose axis passes through (1 , 2 , 3) and has the direction cosines proportional to (2 , -3 , 6).

SECTION – C (5 X 9 = 45)

Answer ALL Questions:

21. Trace the conic $\frac{\ell}{r} = 1 + e\cos\theta$.

(OR)

22. Find the equation of the chord of the conic $\frac{\ell}{r}=1+e\cos\theta$ joining the points whose vectorial angles are $\alpha - \beta$ and $\alpha + \beta$.

23. Find the shortest distance between the lines $\frac{x-x_1}{\ell_1}=\frac{y-y_1}{m_1}=\frac{z-z_1}{n_1}$ and $\frac{x-x_2}{\ell_2}=\frac{y-y_2}{m_2}=\frac{z-z_2}{n_2}$

(OR)

24. Find the surface generated by a straight line which meets two given skew lines at the same angle.

25. Prove that the equation $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ always represent a sphere and find its centre and radius.

(OR)

26. Find the equation of the sphere which passes through the circle $x^2+y^2+z^2-2x-4y = 0$, $x+2y+3z = 8$ and touches the plane $4x + 3y = 25$.

27. Find the equation to the cone through the coordinate axes and the lines in which the plane $\ell x+my+nz = 0$ cuts the cone $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy = 0$.

(OR)

28. 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.

29. Find the equation of the cylinder whose generators are parallel to the z-axis and the guiding curve is $ax^2+by^2=cz$, $\ell x+my+nz = p$.

(OR)

30. 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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