S.NO. 447

BATCH: 87 - 2017

Reg. No.

END OF SEMESTER EXAMINATIONS, APRIL / MAY-2018

MATHEMATICS PAPER-IV

SUBJECT CODE: 14UBMA08 4

MAJOR: B.Sc (Chemistry)

TIME : 3 HOURS

SEMESTER : II

MAX. MARKS: 75

SECTION – A (5 X2 = 10)

Answer All the Questions:

1. Define coaxial system.

(OR)

2. Write the condition for two circles to cut one another orthogonally.
3. Define Conjugate diameter of the ellipse.

(OR)

4. Write any two properties of conjugate diameter of an Hyperbola.
5. What is the polar equation of a conic?

(OR)

6. Write the co-ordinates of the point on the line joining the points (x_1, y_1, z_1) and (x_2, y_2, z_2).
7. Write the equation of the line passing through the points (x_1, y_1, z_1) and (x_2, y_2, z_2)

(OR)

8. What are the conditions required for the lines to be coplanar?
9. What is the equation of a sphere with the extremities of a diameter at the points (x_1, y_1, z_1) and (x_2, y_2, z_2)?

(OR)

10. Define Centre of sphere.

SECTION – B (5 X 4 = 20)

Answer All the Questions:

11. Find the limiting points of the system of circles coaxial with $x^2 + y^2 - 6x - 6y + 4 = 0; x^2 + y^2 - 2x - 4y + 3 = 0$

(OR)

12. Show that the two circles $x^2 + y^2 - 6x - 9y + 13 = 0$ and $x^2 + y^2 - 2x - 16y = 0$ touch each other.
13. If $\alpha, \beta, \gamma, \delta$ be the eccentric angles of four points on the ellipse such that the normal at them are concurrent, then show that $\alpha + \beta + \gamma + \delta$ is an odd multiple of π.

(OR)

14. Show that the common chords of an ellipse and a circle taken in pairs are equally inclined to the axes of the ellipse.
15. Show that in a conic the semi-latus rectum is the harmonic mean between the segments of a focal chord.

(OR)

16. Find the co-ordinates of the point A in which the line joining the points P(6,-2,1) and Q(3,-4,2) meet the XOY plane. In which ratio does A divide PQ?
17. Find the equation of the plane passing through the point (-2,3,1) and intersecting line of the planes $x + 4y - 2x + 9 = 0$ and $2x - 3y + z = 5$.

(OR)

18. Find the distance between the two parallel planes $4x + 3y - 12z + 6 = 0$ and $4x + 3y - 12z - 9 = 0$.

..2...

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

(OR)

20. Find the equation of the sphere which touches the sphere $x^2+y^2+z^2-x+3y+2z-3=0$ at (1,1,-1) and passing through (2,0,1).

SECTION – C (5 X 9 = 45)

Answer All the Questions:

21. Find the equation to the circle whose diameter is the common chord of the two circles $(x-a)^2+y^2=a^2$ and $x^2+(y-b)^2=b^2$. Find also the length of the common chord.

(OR)

22. Find the equation to the circle which cuts orthogonally the three circles $x^2+y^2+2x+4y+1=0$; $x^2+y^2-4x+3=0$; $x^2+y^2+6y+5=0$.

23. If the normals at the points whose eccentric angles are α,β,γ are concurrent then show that $\sin(\beta+\gamma)+\sin(\gamma+\alpha)+\sin(\alpha+\beta)=0$.

(OR)

24. Show that a circle will cut an ellipse in four points, Real or imaginary, and that the sum of eccentric angles of the four points is an even multiple of π.

25. If the normal at L, one of the extremities of the latus rectum of the conic $\frac{l}{r}=1+e.\cos\theta$ meets the curve again in Q, show that $SQ=l.\frac{1+3e^2+e^4}{1+e^2-e^4}$.

(OR)

26. If $(l_1,m_1,n_1),(l_2,m_2,n_2),(l_3,m_3,n_3)$ are the direction cosines of three mutually perpendicular lines, show that the line whose direction cosines are proportional to $l_1+l_2+l_3, m_1+m_2+m_3, n_1+n_2+n_3$ makes equal angles with them.

27. Find the equation to the line passing through (1,1,1) which cuts each of the two lines $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-2}{4}$; $\frac{x}{6}=\frac{y}{3}=\frac{z}{2}$.

(OR)

28. Find the shortest distance between the lines $\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$; $\frac{x+3}{-3}=\frac{y+7}{2}=\frac{z-6}{4}$

Determine also its equations.

29. Find the equation of the sphere which has it centre in the plane $5x+y-4z+3=0$ and passing through the circle.

(OR)

30. Show that the intersection of the two spheres $x^2+y^2+z^2-2x-4y+6z-2=0$; $x^2+y^2+z^2-4x-6y+4z+4=0$ is a circle lying in the plane $x+y+z=3$. Find its centre and radius.

****