CHAPTER - 11

CONIC SECTIONS

3 marks questions

Find the centre and radius of the following equation of the circles

1) $x^2 + y^2 + 8x + 10y - 8 = 0.$ (U)

2) $x^2 + y^2 - 8x + 10y - 12 = 0.$ (U)

3) $x^2 + y^2 - 4x - 8y - 45 = 0.$ (U)

4) $2x^2 + 2y^2 - x = 0.$ (U)

5) Find the equation of the circle which passes through (2, -2) and (3, 4) and whose centre lies on the line x + y=2. (U)

6) Find the equation of the circle which passes through (4, 1) and (6, 5) and whose centre lies on the line 4x+y=16. (U)

7) Find the equation of the circle which passes through (2, 3) and (-1, 1) and whose centre lies on the line x-3y-11=0. (U)

8) Find the equation of the circle with radius 5 whose centre lies on x-axis and passes through the point (2, 3). (U)

9) Find the equation of the circle passing through (0, 0) and making intercepts 'a' and 'b' on the coordinate axes. (U)

10) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $y^2 = 8x.$ (U)

11) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $y^2 = 12x.$ (U)

12) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $y^2 = 10x.$ (U)

13) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $y^2 = -8x.$ (U)

14) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $x^2 = 6y.$ (U)

15) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $x^2 = -16y.$ (U)

16) Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $x^2 = -9y$. (U)

17) Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $y^2 = 8x$. (U)

18) Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $y^2 = 12x$. (U)

19) Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $y^2 = 10x$. (U)

20) Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $y^2 = -8x$. (U)

21) Find the coordinates of the focus, , the equation of the directrix and latus rectum of the parabola $x^2 = 6y$. (U)

22) Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $x^2 = -16y$. (U)

23) Find the coordinates of the focus, , the equation of the directrix and latus rectum of the parabola $x^2 = -9y$. (U)

24) Find the equation of the parabola given that vertex (0, 0), passing through (2, 3) and axis is along x-axis (U)

25) Find the equation of the parabola given that vertex (0, 0), passing through (5, 2) and symmetric with respect to y-axis. (U)

26) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. (U)

27) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$. (U)

28) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. (U)

29) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{49} + \frac{y^2}{36} = 1$. (U)

30) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{4} + \frac{y^2}{25} = 1$. (U)

31) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{100} = 1$. (U)

32) Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{100} + \frac{y^2}{400} = 1$. (U)

33) Find the foci, eccentricity and Latus rectum of the ellipse $9x^2 + 4y^2 = 36$. (U)

34) Find the foci, eccentricity and Latus rectum of the ellipse $36x^2 + 4y^2 = 144$. (U)

35) Find the foci, eccentricity and Latus rectum of the ellipse $16x^2 + y^2 = 16$. (U)

36) Find the foci, eccentricity and Latus rectum of the ellipse $4x^2 + 9y^2 = 36$. (U)

37) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$.(U)

38) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$.(U)

39) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$.(U)

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41) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{4} + \frac{y^2}{25} = 1$.(U)

42) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{100} = 1$. (U)

43) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{100} + \frac{y^2}{400} = 1$. (U)

44)Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $9x^2 + 4y^2 = 36$. (U)

45) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $36x^2 + 4y^2 = 144$. (U)

46) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $16x^2 + y^2 = 16$. (U)

47) Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $4x^2 + 9y^2 = 36$. (U)

48) Find the equation of the ellipse given that Vertices$(\pm 5,\ 0)$ and foci$(\pm 4,\ 0)$. (U)

49)Find the equation of the ellipse given that Vertices$(\pm 13,\ 0)$ and foci$(\pm 5,\ 0)$. (U)

50)Find the equation of the ellipse given that Vertices$(\pm 6,\ 0)$ and foci$(\pm 4,\ 0)$. (U)

51)Find the equation of the ellipse given that Vertices$(0,\ \pm 13)$ and foci$(0,\ \pm 5)$. (U)

52) Find the equation of the ellipse given that Length of major axis is 26 and foci $(\pm 5,\ 0)$. (U)

53) Find the equation of the ellipse given that Length of major axis is 20 and foci$(0, \pm 5)$. (U)

54) Find the equation of the ellipse given that Length of major axis is 16 and foci$(0, \pm 6)$. (U)

55)Find the equation of the ellipse given that Foci$(\pm 3,\ 0)$ and length of semi major axis is 4. (U)

56) Find the equation of the ellipse given that Centre at (0, 0), major axis on the x-axis and passing through the points (4, 3) and (-1, 4). (U)

57) Find the equation of the ellipse given that Centre at (0, 0) , major axis on the x-axis and passing through the points (4, 3) and (6,2). (U)

58)Find the equation of the ellipse given that Centre at (0, 0), major axis on the y-axis and passing through the points (3, 2) and (1, 6). (U)

59) Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$.(U)

60) Find the foci, the eccentricity and the length of the latus rectum of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$.(U)

61) Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $16x^2 - 9y^2 = 576$. (U)

62) Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $\frac{y^2}{9} - \frac{x^2}{27} = 1$.(U)

63) Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $9y^2 - 4x^2 = 36$. (U)

64) Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $5y^2 - 9x^2 = 36$. (U)

65) Find the foci, the eccentricity and the length of the latus rectum of the hyperbola $49y^2 - 16x^2 = 784$. (U)

66) Find the foci, the eccentricity and the length of the latus rectum of the hyperbola $y^2 - 16x^2 = 16$. (U)

67) Find the foci, vertices and the length of the latus rectum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$. (U)

68) Find the foci , vertices and the length of the latus rectum of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$. (U)

69) Find the foci, vertices and the length of the latus rectum of the hyperbola $16x^2 - 9y^2 = 576$. (U)

70) Find the foci , vertices and the length of the latus rectum of the hyperbola $\frac{y^2}{9} - \frac{x^2}{27} = 1$. (U)

71) Find the foci , vertices and the length of the latus rectum of the hyperbola $9y^2 - 4x^2 = 36$.(U)

72) Find the foci , vertices and the length of the latus rectum of the hyperbola $5y^2 - 9x^2 = 36$. (U)

73) Find the foci , vertices and the length of the latus rectum of the hyperbola $49y^2 - 16x^2 = 784$.(U)

74) Find the foci , vertices and the length of the latus rectum of the hyperbola $y^2 - 16x^2 = 16$.(U)

75) Find the equation of the hyperbola given that Vertices $(\pm 2,\ 0)$and foci$(\pm 3,\ 0)$. (U)

76) Find the equation of the hyperbola given that Vertices $(0,\ \pm 5)$and foci$(0,\ \pm 8)$. (U)

77) Find the equation of the hyperbola given that Vertices $(0,\ \pm 3)$ and foci $(0,\ \pm 5)$. (U)

78) Find the equation of the hyperbola given that Vertices $\left(0,\ \frac{\pm\sqrt{11}}{2}\right)$and foci$(0,\ \pm 3)$. (U)

79) Find the equation of the hyperbola given that Foci $(\pm 5,\ 0)$ and the transverse axis is of length 8.(U)

80) Find the equation of the hyperbola given that Foci $(0,\ \pm 13)$and conjugate axis is of length 24.(U)

81) Find the equation of the hyperbola given that Foci $\left(\pm 3\sqrt{5}\ ,\ 0\right)$and latus rectum is of length 8.(U)

82) Find the equation of the hyperbola given that Foci $(\pm 4\ ,\ 0)$and the latus rectum is of length 12.(U)

83) Find the equation of the hyperbola given that Foci $(0,\ \pm 12)$and latus rectum is of length 36 (U)

84) Find the equation of the hyperbola given that Vertices$(\pm 7, 0)$, $e = \frac{4}{3}$. (U)

85) Find the equation of the hyperbola given that Foci$\left(0, \pm\sqrt{10}\right)$, passing through (2, 3). (U)

86) The focus of a parabolic mirror is at a distance of 5 cm from its vertex. If the mirror is 45 cm deep, find the diameter of the parabola. (A)

87) An arch is in the form of a parabola with its axis vertical. The arch is 10 m high and 5 m wide at the base. How wide is it 2 m from the vertex of the parabola? (A)

88) A beam is supported at its ends by supports which are 12metres apart. Since the rod is concentrated at its centre, there is a deflection of 3 cm at the centre and the deflected beam is in the shape of a parabola. How far from the centre is the deflection 1 cm? (A)

89) The cable of a uniformly loaded suspension bridge hangs in the form of a parabola. The roadway which is horizontal and 100 m long is supported by vertical wires attached to the cable, the longest wire being 30 m and the shortest being 6 m. Find the length of a supporting wire attached to the roadway 18 m from the middle. (A)

90) Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum. (A)

91) An equilateral triangle is inscribed in the parabola $y^2 = 4ax$, where one vertex is at the vertex of the parabola. Find the length of the side of the triangle. (S)

92) A rod AB of length 15 cm rests in between two coordinate axes in such a way that the end point A lies on x-axis and end point B lies on y-axis. A point P(x, y) is taken on the rod in such a way that AP=6 cm. Show that the locus of P is an ellipse. (S)

93) A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point P on the rod, which is 3 cm from the end in contact with the x-axis. (S)

94) A man running a racecourse notes that the sum of the distances from the two flag posts from him is always 10 m and the distance between the flag posts is 8 m. Find the equation of the posts traced by the man. (S)

95) An arch is in the form of a semi-ellipse. It is 8m wide and 2 m high at the centre. Find the height of the arch at a point 1.5 m from one end. (S)

6 marks questions

96)Define the Ellipse as set of points and derive the equation of the ellipse in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. $(a > b)$. (K)

97) Define the Hyperbola as set of points and derive the equation of the hyperbola in the form $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. (K)

98) Define the Parabola and derive the equation of the parabola in the form $y^2 = 4ax$. Find the length of the Latus Rectum. (K)

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