RAVI MATHS TUITION CENTER ,GKM COLONY, CH- 82. PH: 8056206308

2D ANALYTICAL GEOMETRY FULL

12th Standard

Maths

Reg.No. : | | | | | | |

Exam Time : 03:00:00 Hrs

Total Marks : 90

20 x 1 = 20

1) The equation of the circle passing through(1,5) and (4,1) and touching y -axis is $x^2+y^2-5x-6y+9+(4x+3y-19)=0$ whereλ is equal to

(a) $0, -\frac{40}{9}$ (b) 0 (c) $\frac{40}{9}$ (d) $\frac{-40}{9}$

2) The circle $x^2+y^2=4x+8y+5$intersects the line$3x-4y=m$ at two distinct points if

(a) $15< m < 65$ (b) $35< m < 85$ (c) $-85< m < -35$ (d) $-35< m < 15$

3) The radius of the circle$3x^2+by^2+4bx-6by+b^2=0$ is

(a) 1 (b) 3 (c) $\sqrt{10}$ (d) $\sqrt{11}$

4) If P(x, y) be any point on $16x^2+25y^2=400$ with foci F1 (3,0) and F2 (-3,0) then $PF_1\ PF_2 +$ is

(a) 8 (b) 6 (c) 10 (d) 12

5) The radius of the circle passing through the point(6,2) two of whose diameter are$x+y=6$ and $x+2y=4$ is

(a) 10 (b) $2\sqrt{5}$ (c) 6 (d) 4

6) If the normals of the parabola $y^2 = 4x$ drawn at the end points of its latus rectum are tangents to the circle $(x-3)^2+(y+2)^2=r^2$, then the value of r^2 is

(a) 2 (b) 3 (c) 1 (d) 4

7) The ellipse E1 $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E2 passing through the point(0,4) circumscribes the rectangle R . The eccentricity of the ellipse is

(a) $\frac{\sqrt{2}}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

8) Tangents are drawn to the hyperbola $\frac{x^2}{9} + \frac{y^2}{4} = 1$ 1parallel to the straight line$2x-y=1$. One of the points of contact of tangents on the hyperbola is

(a) $\frac{9}{2\sqrt{2}}, \frac{-1}{\sqrt{2}}$ (b) $\frac{-9}{2\sqrt{2}}, \frac{1}{\sqrt{2}}$ (c) $\frac{9}{2\sqrt{2}}, \frac{1}{\sqrt{2}}$ (d) $\left(3\sqrt{3}, -2\sqrt{2}\right)$

9) Let C be the circle with centre at(1,1) and radius =1. If T is the circle centered at(0, y) passing through the origin and touching the circleC externally, then the radius of T is equal to

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{\sqrt{3}}{\sqrt{2}}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

10) Area of the greatest rectangle inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$ is

(a) 2ab (b) ab (c) $\sqrt{ab}$ (d) $\frac{a}{b}$

11) The eccentricity of the ellipse $(x-3)^2 +(y-4)^2 =\frac{y^2}{9}$ is

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{3\sqrt{2}}$ (d) $\frac{1}{\sqrt{3}}$

12) The circle passing through(1,-2) and touching the axis of x at (3,0) passing through the point

(a) (-5,2) (b) (2,-5) (c) (5,-2) (d) (-2,5)

13) The locus of a point whose distance from (-2,0) is $\frac{2}{3}$ times its distance from the line $x = \frac{-9}{2}$ is

(a) a parabola (b) a hyperbola (c) an ellipse (d) a circle

14)

If the coordinates at one end of a diameter of the circle $x^2+y^2-8x-4y+c = 0$ are (11,2) , the coordinates of the other end are

(a) (-5,2) (b) (2,-5) (c) (5,-2) (d) (-2,5)

15) If (0, 4) and (0, 2) are the vertex and focus of a parabola then its equation is

(a) $x^2 + 8y = 32$ (b) $y^2 + 8x = 32$ (c) $x^2 - 8y = 32$ (d) $y^2 - 8x = 32$

16) $y^2 - 2x - 2y + 5 = 0$ is a

(a) circle (b) parabola (c) ellipse (d) hyperbola

17) In an ellipse, the distance between its foci is 6 and its minor axis is 8, then e is

(a) $\frac{4}{5}$ (b) $\frac{1}{\sqrt{52}}$ (c) $\frac{3}{5}$ (d) $\frac{1}{2}$

18) The director circle of the ellipse $\frac{x^2}{9} - \frac{y^2}{5} = 1$ is

(a) $x^2 + y^2 = 4$ (b) $x^2 + y^2 = 9$ (c) $x^2 + y^2 = 45$ (d) $x^2 + y^2 = 14$

19) The equation of tangent at (1, 2) to the circle $x^2 + y^2 = 5$ is

(a) x+y=3 (b) x + 2y = 3 (c) x- y= 5 (d) x - 2y = 5

20) The angle between the tangents drawn from (1, 4) to the parabola $y^2 = 4x$ is _____

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{5}$ (d) $\frac{\pi}{5}$

ANSWER 7 ONLY 7 X 2 = 14

21) Determine whether $x+y-1=0$ is the equation of a diameter of the circle $x^2+y^2-6x+4y+c = 0$ for all possible values of c .

22) If $y=4x+c$ is a tangent to the circle $x^2+y^2=9$, find c .

23) Find the equation of the circle with centre (2,-1) and passing through the point (3,6) in standard form.

24) Obtain the equation of the circle for which (3,4) and (2,-7) are the ends of a diameter.

25) Find the vertices, foci for the hyperbola $9x^2-16y^2=144$.

26) Find centre and radius of the following circles.

$2x^2+2y^2-6x+4y+2=0$

27) Find the equation of tangent to the circle $x^2 + y^2 + 2x - 3y - 8 = 0$ at (2, 3).

28) Find the length of the tangent from (2, -3) to the circle $x^2 + y^2 - 8x - 9y + 12 = 0$.

29) If the line $y = 3x + 1$, touches the parabola $y^2 = 4ax$, find the length of the latus rectum?

30) Find the equation of the hyperbola whose vertices are $(0, \pm 7)$ and $e = \frac{4}{3}$

ANSWER 7 ONLY 7 X 3 = 21

31) Find the equation of the circle described on the chord $3x+y+5= 0$ of the circle $x^2+y^2=16$ as diameter.

32) Find the centre and radius of the circle$3x^2+(a+1)y^2+6x-9y+a+4=0$.

33) A circle of area 9π square units has two of its diameters along the lines $x+y=5$ and $x-y=1$. Find the equation of the circle.

34) Determine whether the points(-2,1),(0,0) and (-4,-3) lie outside, on or inside the circle $x^2+y^2-5x+2y-5=0$.

35) Find the equation of the parabola with focus $\left(-\sqrt{2}, 0\right)$ and directrix $x=\sqrt{2}$.

36) Find the equation of the ellipse with foci $(\pm 2,0)$, vertices $(\pm 3,0)$.

37) Find the equation of the hyperbola with vertices $(0,\pm 4)$ and foci$(0,\pm 6)$.

38) Find the vertex, focus, equation of directrix and length of the latus rectum of the following:

$y^2 = 16x$

39) Find the equation of the tangent to the parabola $y^2 = 16x$perpendicular to $2x+2y+3=0$.

40) The parabolic communication antenna has a focus at 2m distance from the vertex of the antenna. Find the width of the antenna 3m from the vertex.

ANSWER 7 ONLY 7 x 5 = 35

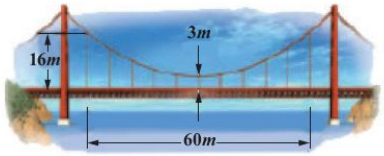
41) Find the equation of the circle passing through the points(1,1), (2,-1) , and(3,2) .

42) Two coast guard stations are located 600 km apart at points A(0,0) and B(0,600). A distress signal from a ship at P is received at slightly different times by two stations. It is determined that the ship is 200 km farther from station A than it is from station B. Determine the equation of hyperbola that passes through the location of the ship.

43) A tunnel through a mountain for a four lane highway is to have a elliptical opening. The total width of the highway (not the opening) is to be 16m, and the height at the edge of the road must be sufficient for a truck 4m high to clear if the highest point of the opening is to be 5m approximately . How wide must the opening be?

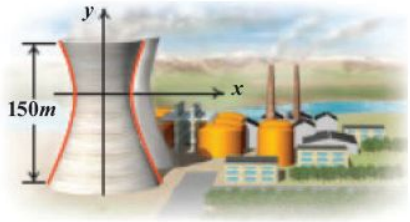
44) At a water fountain, water attains a maximum height of 4m at horizontal distance of 0 5 . m from its origin. If the path of water is a parabola, find the height of water at a horizontal distance of 0.75m from the point of origin.

45) Parabolic cable of a 60m portion of the roadbed of a suspension bridge are positioned as shown below. Vertical Cables are to be spaced every 6m along this portion of the roadbed. Calculate the lengths of first two of these vertical cables from the vertex.



46) Cross section of a Nuclear cooling tower is in the shape of a hyperbola with equation $\frac{x^2}{30^2} - \frac{y^2}{44^2} = 1$

The tower is 150m tall and the distance from the top of the tower to the centre of the hyperbola is half the distance from the base of the tower to the centre of the hyperbola. Find the diameter of the top and base of the tower.



47) Assume that water issuing from the end of a horizontal pipe, 7 5 . m above the ground, describes a parabolic path. The vertex of the parabolic path is at the end of the pipe. At a position 2 5 . m below the line of the pipe, the flow of water has curved outward 3m beyond the vertical line through the end of the pipe. How far beyond this vertical line will the water strike the ground?

48) On lighting a rocket cracker it gets projected in a parabolic path and reaches a maximum height of 4m when it is 6m away from the point of projection. Finally it reaches the ground 12m away from the starting point. Find the angle of projection.

49) Points A and B are 10km apart and it is determined from the sound of an explosion heard at those points at different times that the location of the explosion is 6 km closer to A than B . Show that the location of the explosion is restricted to a particular curve and find an equation of it.

50)

Identify the type of conic and find centre, foci, vertices, and directrices of each of the following :
$18x^2+12y^2-144x+48y+120 = 0$

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