SET - II

RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

MATRIC PRACTICE PAPER (2024)

(Mathematics)

Grade: XII **Marks: 40 marks**
Chapter: Two Dimensional Analytical Geometry II **Time: 90 minutes**

SECTION A (10x1=10)

Choose the correct option.

1. The length of the latus rectum of the parabola $x^2=24y$ is
   (a) 8 (b) 24 (c) 6 (d) 12

2. The general equation of a circle with centre (-3,-4) and radius 3 units is
   (a) $x^2+y^2-6x+8y-16=0$ (b) $x^2+y^2-6x-8y+16=0$
   (c) $x^2+y^2+6x-8y+16=0$ (d) $x^2+y^2+6x+8y+16=0$

3. the focus of the parabola $y^2-8x-2y+17=0$ is
   (a) (1,4) (b) (3,1) (c) (4,1) (d) (1,3)

4. 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) $\frac{a}{b}$

5. If the coordinate at one end of a diameter of a circle $x^2+y^2-8x-4y+c=0$ is (11,2), the coordinate of the other end is
   (a) (-5,2) (b) (-3,2) (c) (5,-2) (d) (-2,5)

6. An ellipse has OB as semi minor axes, F and F' its foci and the angle FBF' is a right angle, then the eccentricity of the ellipse is
   (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{\sqrt{3}}$

7. Tangents are drawn to the hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ parallel 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) $(3\sqrt{3},-2\sqrt{2})$

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8. Focus of $\frac{x^2}{7} - \frac{y^2}{9} = 1$ is

   (a) $(\pm\sqrt{2},0)$ (b) $(0,\pm\sqrt{2})$ (c) $(\pm4,0)$ (d) $(0,\pm4)$

9. 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) circle (c) ellipse (d) hyperbola

10. 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 circle C externally, then the radius of T is equal to

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

SECTION B (3x2=6)

Answer the following.

11. Find the equation of the parabola if the curve is open leftward, vertex is (2,1) and passing through the point (1,3).

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

13. Find the equations of the tangent and normal to the circle $x^2+y^2=25$ at point P(-3,4).

SECTION C (3x3=9)

Answer the following.

14. A concrete bridge is designed as a parabolic arch. The road over bridge is 40m long and the maximum height of the arch is 15m. Write the equation of the parabolic arch. Take (0,0) as the vertex.

15. Prove that the general equation of the circle whose diameter is the line segment joining the points (-4,-2) and (-1,-1) is $x^2+y^2+5x+3y+6=0$.

16. If the equation $3x^2+(3-p)xy+qy^2-2px=8pq$ represent a circle, find p and q. Also determine the centre and radius of the circle.

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SECTION D (3x5=15)

Answer the following.

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

18. Show that the equation of the parabola with focus $(-\sqrt{2},0)$ and directrix $x=\sqrt{2}$ is $y^2 = -4\sqrt{2}x$.

19. At a water fountain, water attains a maximum height of 4m at horizontal distance of 0.5m from its origin. If the path of the water is a parabola, find the height of the water at the horizontal distance of 0.75m from the point of origin.

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