



# RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

**MATRIC PRACTICE PAPER (2024)**

**(Mathematics)**

**Grade: XII**

**Chapter: Two Dimensional Analytical Geometry II**

**Marks: 40 marks**

**Time: 90 minutes**

## SECTION A

**( 10x1=10 )**

**Choose the correct option.**

- The radius of the circle  $3x^2+by^2+4bx-6by+b^2=0$  is  
 (a) 1                      (b) 3                      (c)  $\sqrt{10}$                       (d)  $\sqrt{11}$
- The vertex of the parabola  $x^2=8y-1$  is  
 (a)  $(0, \frac{-1}{8})$                       (b)  $(\frac{-1}{8}, 0)$                       (c)  $(\frac{1}{8}, 0)$                       (d)  $(0, \frac{1}{8})$
- If  $x+y=k$  is a normal to the parabola  $y^2=12x$ , then the value of k is  
 (a) 3                      (b) -1                      (c) 1                      (d) 9
- The circle passing through  $(1, -2)$  and touching the axis of x at  $(3, 0)$  passes through the point  
 (a)  $(-5, 2)$                       (b)  $(2, -5)$                       (c)  $(5, -2)$                       (d)  $(-2, 5)$
- Identify the type of conic for the equation  $x^2-2y=x+3$   
 (a) Ellipse                      (b) circle                      (c) parabola                      (d) hyperbola
- The area of the quadrilateral formed with foci of the hyperbolas  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  and  $\frac{y^2}{a^2} - \frac{x^2}{b^2} = -1$  is  
 (a)  $4(a^2+b^2)$                       (b)  $2(a^2+b^2)$                       (c)  $a^2+b^2$                       (d)  $\frac{1}{2}(a^2+b^2)$
- If P(x,y) be any point on  $16x^2+25y^2=400$  with foci  $F_1(3,0)$  and  $F_2(-3,0)$ , then  $PF_1+PF_2$  is  
 (a) 8                      (b) 6                      (c) 10                      (d) 12
- The equation of the circle passing through the foci of the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$  having centre at  $(0, 3)$  is  
 (a)  $x^2+y^2-6y-7=0$                       (b)  $x^2+y^2-6y+7=0$                       (c)  $x^2+y^2-6y-5=0$                       (d)  $x^2+y^2-6y+5=0$

9. The equation of the normal to the circle  $x^2+y^2-2x-2y+1=0$  which is parallel to the line  $2x+4y=3$  is  
 (a)  $x+2y=3$                       (b)  $x+2y+3=0$                       (c)  $2x+4y+3=0$                       (d)  $x-2y+3=0$
10. Consider an ellipse whose centre is of the origin and its major axis is along x-axis. If its eccentricity is  $\frac{3}{5}$  and the distance between its foci is 6, then the area of the quadrilateral inscribed in the ellipse with diagonals as major and minor axis of the ellipse is  
 (a) 8                                      (b) 32                                      (c) 80                                      (d) 40

### SECTION B

( 3x2=6 )

**Answer the following.**

11. Find the equation of the parabola whose vertex is  $(-2,5)$  and focus  $(-2,2)$ .
12. The line  $3x+4y-12=0$  meets the coordinate axes at A and B. find the equation of the circle drawn on AB as diameter.
13. Find the vertices and foci of the hyperbola  $9x^2-16y^2=144$ .

### SECTION C

( 3x3=9 )

**Answer the following.**

14. Find the equation of the parabola with vertex  $(-1,-2)$ , axis parallel to y axis and passing through  $(3,6)$ .
15. The maximum and the minimum distances of the Earth and the sun respectively are  $152 \times 10^6$  km and  $94.5 \times 10^6$  km. The sun is at one focus of the elliptical orbit. Find the distance from sun to other focus.
16. Prove that the length of the latus rectum of the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  is  $\frac{2b^2}{a}$ .

### SECTION D

( 3x5=15 )

**Answer the following.**

17. Find the equation of the circle passing through the points  $(1,1)$ ,  $(2,-1)$  and  $(3,2)$ .
18. Assume that the water issuing from the end of a horizontal pipe, 7.5m above the ground, describes a parabolic path. The vertex of the parabolic path is at the end of

the pipe. At a position 2.5m below the line of the pipe, the flow of the 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?

19. 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.