N K MATHS ACADEMY

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UNIT TEST-2022-23

MATHEMATICS

UNIT TEST -5

MARKS: 40 **TIME: 1.00 HR**

I. CHOOSE THE BEST ANSWER: **8X1=8**

1. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is

(1) $\frac{4}{3}$ (2) $\frac{4}{\sqrt{3}}$ (3) $\frac{2}{\sqrt{3}}$ (4) $\frac{3}{2}$

2. The length of the diameter of the circle which touches the x-axis at point (1,0) and passes through the point (2,3).

(1) $\frac{6}{5}$ (2) $\frac{5}{3}$ (3) $\frac{10}{3}$ (4) $\frac{3}{5}$

3. 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

(1)8 (2)6 (3)10 (4)12

4. The area of quadrilateral formed with foci of the hyberbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{b^2}=-1$ is

(1) $4(a^2+b^2)$ (2) $2(a^2+b^2)$ (3) a^2+b^2 (4) $\frac{1}{2}(a^2+b^2)$

5. 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 point of contact of tangent on the hyperbola is

(1) $\left(\frac{9}{2\sqrt{2}},\frac{-1}{\sqrt{2}}\right)$ (2) $\left(\frac{-9}{2\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ (3) $\left(\frac{9}{2\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ (4) $\left(3\sqrt{3},-2\sqrt{2}\right)$

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

(1) (-5, 2) (2) (2,-5) (3) (5,-2) (4) (-2, 5)

7. The focus of the parabola $x^2=16y$ is.

(1) (4, 0) (2) (0, 4) (3) (-4, 0) (4) (0,-4)

8. The distance between the foci of the ellipse $9x^2+5y^2=180$ is.

(1) 4 (2) 6 (3) 8 (4) 2.

II. ANSWER ANY 4 QUESTIONS: **4X2=8**

9. Examine the position of the point $(2,3)$ with respect to the circle $x^2+y^2-6x-8y+12=0$.

10. Find the equation of the parabola with vertex $(1,-2)$ and focus $(4,-2)$.

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

12. Find the length of latus rectum of the parabola $y^2 = 4ax$.

13. Find the equation of tangent at t=2 to the parabola $y^2 = 8x$. (Use parametric form)

III. ANSWER ANY 3 QUESTIONS: **3X3=9**

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

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

16. Identify the type of conic and find centre , foci, vertices and directrices of $\frac{x^2}{25} + \frac{y^2}{9} = 1$.

17. The equation $y = \frac{1}{32}x^2$ models cross section of the parabolic mirrors that are used for solar energy there is a heating tube located at the focus of each parabola; how high is this tube located above the vertex of the parabola?

IV. ANSWER ANY 3 QUESTIONS: **3X5=15**

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

19. Find the foci, vertices and length of major and minor axis of the conic
$4x^2 + 36y^2 + 40x - 288y + 532 = 0$.

20. Identify the type of conic and find center, foci, vertices and directrix of
$9x^2 - y^2 - 36x - 6y + 18 = 0$.

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