One Two academy | Two dimensional Analytical Geometry – II

Maximum Mark: 25 **Mathematics** **Time: 50 minutes**

Choose the correct answer: **3 x 1 = 3**

1. 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

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

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

3. In case of a hyperbola as $e \to 1$ the hyperbola becomes a _____.

(a) pointed nose (b) flat (c) circle (d) point

Answer the following: **3 x 2 = 6**

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

5. An equation of the elliptical part of an optical lens system is $\frac{x^2}{16}+\frac{y^2}{9}=1$. The parabolic part of the system has a focus in common with the right focus of the ellipse .The vertex of the parabola is at the origin and the parabola opens to the right. Determine the equation of the parabola.

6. Find the equation of hyperbola whose directrix is 2x + y = 1,focus (1,2) and e = $\sqrt{3}$.

Answer any two of the following: **2 x 3 = 6**

7. 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.

8. Show that the absolute value of difference of the focal distances of any point P on the hyperbola is the length if its transverse axis.

9. If the normal at the point $'t_1'$ on the parabola $y^2 = 4ax$ meets the parabola again at the point $'t_1'$ then prove that $t_2 = -\left(t_1 + \frac{2}{t_1}\right)$

Answer the following: **2 x 5 = 10**

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

11. Find the equations of tangent and normal to the ellipse $x^2 + 4y^2 = 32$ when $\theta = \frac{\pi}{4}$.

OR

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?

All the Best

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Answer Key attached in the next page !!!

This page is to prevent seeing answer key

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Answer Key

Q.no	Solution	Marks
1.	(b) $2\sqrt{5}$	**1**
2.	(a) 2ab	**1**
3.	(a) pointed nose	**1**
4.	$\frac{x^2}{9}+\frac{y^2}{5}=1$	**2**
5.	$\boldsymbol{y^2=4\sqrt{7}x}$	**2**
6.	$\boldsymbol{7x^2+12xy-2y^2-2x+14y-22=0}$.	**2**
7.	$\boldsymbol{x^2+y^2-4x-3y=0}$	**3**
8.	Correct proof.	**3**
9.	Correct proof.	
10.	$\boldsymbol{x^2+y^2-5x-y+4=0}$	**5**
11.	Equation of tangent: x + 2y – 8 = 0 Equation of normal: y – 2x + 6 = 0 **OR** 26.66 m	**5**

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