1. The normal at the point $(bt_1^2, 2bt_1)$ on a parabola meets the parabola again in the point $(bt_2^2, 2bt_2)$, then- **[AIEEE-2003]**

(1) $t_2 = t_1 + \frac{2}{t_1}$ (2) $t_2 = -t_1 - \frac{2}{t_1}$

(3) $t_2 = -t_1 + \frac{2}{t_1}$ (4) $t_2 = t_1 - \frac{2}{t_1}$

2. The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is- **[AIEEE-2006]**

(1) $xy = \frac{3}{4}$ (2) $xy = \frac{35}{16}$

(3) $xy = \frac{64}{105}$ (4) $xy = \frac{105}{64}$

3. The equation of a tangent to the parabola $y^2 = 8x$ is $y = x + 2$. The point on this line from which the other tangent to the parabola is perpendicular to the given tangents is- **[AIEEE-2007]**

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

4. For the hyperbola $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$, which of the following remains constant when α varies ? **[AIEEE-2007]**

(1) Abscissae of vertices (2) Abscissae of foci
(3) Eccentricity (4) Directrix

5. If two tangents drawn from a point P to the parabola $y^2 = 4x$ are at right angles then the locus of P is :- **[AIEEE-2010]**

(1) $x = 1$ (2) $2x + 1 = 0$
(3) $x = -1$ (4) $2x - 1 = 0$

6. The equation of the hyperbola whose foci are (–2,0) and (2, 0) and eccentricity is 2 is given by : **[AIEEE-2011]**

(1) $-3x^2 + y^2 = 3$ (2) $x^2 - 3y^2 = 3$
(3) $3x^2 - y^2 = 3$ (4) $-x^2 + 3y^2 = 3$

7. The area of the triangle formed by the lines joining the vertex of the parabola, $x^2 = 8y$, to the extremities of its latus rectum is :- **[AIEEE-2012 (Online)]**

(1) 4 (2) 2 (3) 1 (4) 8

8. The normal at $\left(2, \frac{3}{2}\right)$ to the ellipse, $\frac{x^2}{16} + \frac{y^2}{3} = 1$ touches a parabola, whose equation is : **[AIEEE-2012 (Online)]**

(1) $y^2 = 26x$ (2) $y^2 = 14x$
(3) $y^2 = -104x$ (4) $y^2 = -14x$

9. If P_1 and P_2 are two points on the ellipse $\frac{x^2}{4} + y^2 = 1$ at which the tangents are parallel to the chord joining the points (0, 1) and (2, 0), then the distance between P_1 and P_2 is :- **[AIEEE-2012 (Online)]**

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

10. The foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide. Then the value of b^2 is- **[AIEEE-2003] ; [AIEEE-2012 (Online)]**

(1) 9 (2) 1 (3) 5 (4) 7

11. If the eccentricity of a hyperbola $\frac{x^2}{9} - \frac{y^2}{b^2} = 1$, which passes through (k, 2) is $\frac{\sqrt{13}}{3}$, then the value of k^2 is :- **[AIEEE-2012 (Online)]**

(1) 2 (2) 8 (3) 18 (4) 1

12. The locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it is : **[JEE(Main)-2014]**

(1) $(x^2 - y^2)^2 = 6x^2 + 2y^2$
(2) $(x^2 - y^2)^2 = 6x^2 - 2y^2$
(3) $(x^2 + y^2)^2 = 6x^2 + 2y^2$
(4) $(x^2 + y^2)^2 = 6x^2 - 2y^2$

13. The slope of the line touching both, the parabolas $y^2 = 4x$ and $x^2 = -32y$ is : **[JEE(Main)-2014]**

(1) $\frac{1}{2}$ (2) $\frac{3}{2}$ (3) $\frac{1}{8}$ (4) $\frac{2}{3}$

14. The area (in sq. units) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9}+\frac{y^2}{5}=1$ is : **[JEE(Main)-2015]**

(1) $\frac{27}{2}$ (2) 27 (3) $\frac{27}{4}$ (4) 18

15. Let O be the vertex and Q be any point on the parabola, $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio 1 : 3, then the locus of P is :- **[JEE(Main)-2015]**

(1) $y^2 = 2x$ (2) $x^2 = 2y$

(3) $x^2 = y$ (4) $y^2 = x$

16. The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is : **[JEE(Main)2016]**

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

17. A hyperbola passes through the point $P\left(\sqrt{2},\sqrt{3}\right)$ and has foci at (± 2, 0). Then the tangent to this hyperbola at P also passes through the point : **[JEE(Main)2017]**

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

(3) $\left(2\sqrt{2},3\sqrt{3}\right)$ (4) $\left(\sqrt{3},\sqrt{2}\right)$

18. Consider a circle with centre lying on the focus of the parabola $y^2 = 2px$ such that it touches the directrix of the parabola. Then a point of intersection of the circle and the parabola is- **[IIT-1995]**

(1) (p/2, p) (2) (–p/2, p)

(3) (–p/2, –p) (4) None of these

19. The locus of the mid-point of the line segment joining the focus to a moving point on the parabola $y^2 = 4ax$ is another parabola with directrix- **[IIT-2002]**

(1) x = –a (2) x = –a/2

(3) x = 0 (4) x =a/2

20. Locus of middle point of segment of tangent to ellipse $x^2 + 2y^2 = 2$. Which is intercepted between the coordinate axes is- **[IIT-2004]**

(1) $\frac{1}{2x^2}+\frac{1}{4y^2}=1$ (2) $\frac{1}{4x^2}+\frac{1}{2y^2}=1$

(3) $\frac{x^2}{2}+\frac{y^2}{4}=1$ (4) $\frac{x^2}{4}+\frac{y^2}{2}=1$

21. A tangent is drawn at some point P of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is intersecting to the coordinate axes at points A and B the minimum area of the ΔOAB is- **[IIT-2005]**

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

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

22. Consider a branch of the hyperbola $x^2 - 2y^2 - 2\sqrt{2}x - 4\sqrt{2}y - 6 = 0$ with vertex at the point A. Let B be one of the end points of its latus rectum. If C is the focus of the hyperbola nearest to the point A. then the area of the triangle ABC is- **[IIT-2008]**

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

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

23. The line passing through the extremity A of the major axis and extremity B of the minor axis of the ellipse $x^2 + 9y^2 = 9$ meets its auxiliary circle at the point M. Then the area of the triangle with vertices at A, M and the origin O is :- **[IIT-2009]**

(1) $\frac{31}{10}$ (2) $\frac{29}{10}$ (3) $\frac{21}{10}$ (4) $\frac{27}{10}$

***24.** Let A and B be two distinct points on the parabola $y^2 = 4x$. If the axis of the parabola touches a circle of radius r having AB as its diameter, then the slope of the line joining A and B can be- **[IIT-2010]**

(1) $-\frac{1}{r}$ (2) $\frac{1}{r}$ (3) $\frac{2}{r}$ (4) $-\frac{2}{r}$

25. Let P(6, 3) be a point on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$. If the normal at the point P intersects the x-axis at (9,0), then the eccentricity of the hyperbola is - **[IIT-2011]**

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

26. Consider the parabola $y^2 = 8x$. Let Δ_1 be the area of the triangle formed by the end points of its latus rectum and the point $P\left(\frac{1}{2},2\right)$ on the parabola, and Δ_2 be the area of the triangle formed by drawing tangents at P and at the end points of the latus rectum. Then $\frac{\Delta_1}{\Delta_2}$ is **[IIT-2011]**

(1) 4 (2) 6
(3) 2 (4) None of these

27. The ellipse $E_1 : \frac{x^2}{9}+\frac{x^2}{4}=1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E_2 passing through the point (0,4) circumscribes the rectangle R. The eccentricity of the ellipse E_2 is - **[IIT-2012]**

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

28. Let S be the focus of the parabola $y^2 = 8x$ and let PQ be the common chord of the circle $x^2 + y^2 - 2x - 4y = 0$ and the given parabola. The area of the triangle PQS is . **[IIT-2012]**

(1) 16 (2) 4
(3) 8 (4) 2

29. 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 **[JEE (Advanced) 2015]**

(1) 4 (2) 3
(3) 2 (4) 1

30. Let the curve C be the mirror image of the parabola $y^2 = 4x$ with respect to the line $x + y + 4 = 0$. If A and B are the points of intersection of C with the line $y = -5$, then the distance between A and B is **[JEE (Advanced) 2015]**

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

* **Marked Question is multiple answer**

PREVIOUS YEARS QUESTIONS — ANSWER KEY — Exercise-II

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**2**	**4**	**4**	**2**	**3**	**3**	**4**	**3**	**1**	**4**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**3**	**3**	**1**	**2**	**2**	**4**	**3**	**1**	**3**	**1**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**2**	**4**	**3,4**	**2**	**3**	**3**	**2**	**3**	**4**