Multiple Choice Questions

[MHT-CET Sample Question]

1. The line $y = mx + 1$ is tangent to the parabola $y^2 = 4x$ if M is .....
   a) 1 b) 2 c) 3 d) 4

2. The length of Latus rectum of the parabola $x^2 - 4x - 8y + 12 = 0$ is
   a) 4 b) 6 c) 8 d) 10

3. If the focus of the parabola is $(0, -3)$ its directix is $y = 3$ then its equation is
   a) $x^2 = -12y$ b) $x^2 = 12y$ c) $y^2 = 12x$ d) $y^2 = -12x$

4. The co-ordinates of a point on the parabola $y^2 = 8x$ whose focal distance is 4 are
   a) $\left(\frac{1}{2}, \pm 4\right)$ b) $(1, \pm 2\sqrt{2})$ c) $(2, \pm 4)$ d) None of these

5. The end points of latus rectum of the parabola $y^2 = 24x$ are
   a) $(6, \pm 12)$ b) $(12, \pm 6)$ c) $(6, \pm 6)$ d) None of these

6. Equation of the parabola with vertex at the origin and diverctnix $x + 8 = 0$ is
   a) $y^2 = 8x$ b) $y^2 = 32x$ c) $y^2 = 16x$ d) $x^2 = 32x$

7. The area of the triangle formed by the line joining the vertex of the parabola $x^2 = 12y$ to the end points of its latus rectum is
   a) 22 sq. units b) 20 sq. units c) 18 sq. units d) 14 sq. units

8. If $P\left(\frac{\pi}{4}\right)$ is any point on the ellipse $9x^2 + 25y^2 = 225$ S and S^1 are its foci then SP. S'P =
   a) 13 b) 14 c) 17 d) 19

9. The equ^n of the parabola having (2, 4) and (2, –4) as end points of its latus return is
   a) $y^2 = 4x$ b) $y^2 = 8x$ c) $y^2 = -16x$ d) $x^2 = 8y$

10. If the parabola $y^2 = 4ax$ passes through (3, 2) then the length of its latus reacum is
    a) $\frac{2}{3}$ b) $\frac{4}{3}$ c) $\frac{1}{3}$ d) 4

11. The eccentricity of rectangular hyperbola is .....
    a) $\frac{1}{2}$ b) $\frac{1}{2\frac{1}{2}}$ c) $2\frac{1}{2}$ d) $\frac{1}{3\frac{1}{2}}$

12. The equation of the ellipse having foci $(\pm 4, 0)$ and ecentricity $\frac{1}{3}$ is
    a) $9x^2 + 10y^2 = 144$ b) $144x^2 + 9y^2 = 1296$
    c) $128x^2 + 144y^2 = 18432$ d) $144x^2 + 128y^2 = 18432$

13. The equation of the ellipse having ecentricity $\frac{\sqrt{3}}{2}$ and passing through $(-8, 3)$ is
    a) $4x^2 + y^2 = 4$ b) $x^2 + 4y^2 = 100$ c) $4x^2 + y^2 = 100$ d) $x^2 + 4y^2 = 4$

14. If the line $4x - 3y + k = 0$ touches the ellipse $5x^2 + 9y^2 = 45$ then the value of k is.
a) $+21$ b) $\pm 3\sqrt{21}$ c) 3 d) 61

15. The equation of the ellipse is $16x^2 + 25y^2 = 400$. The equation of the tangents making an angle of $180°$ with the major axis are
a) $x = 4$ b) $y = \pm 4$ c) $x = -4$ d) $x = \pm 5$

16. The equation of the tangent to the ellipse $4x^2 + 9y^2 = 36$ which is perpendicular to the $3x + 4y = 17$ is
a) $y = 4x + 6$ b) $3y + 4x = 6$ c) $3y = 4x + 6\sqrt{5}$ d) $3y = x + 25$

17. Eccentricity of the hyperbola $16x^2 - 3y^2 - 32x - 12y - 44 = 0$ is
a) $\sqrt{\frac{17}{3}}$ b) $\sqrt{\frac{19}{3}}$ c) $\frac{\sqrt{19}}{3}$ d) $\frac{\sqrt{17}}{3}$

18. Centre of the ellipse $9x^2 + 5y^2 - 36x - 50y - 164 = 0$ is at
a) (2, 5) b) (1, –2) c) (–2, 1) d) (0, 0)

19. If the line $2y - y = 4$ touches the hyperbola $4x^2 - 3y^2 = 24$ the point of contact is.
a) (1, 2) b) (2, 3) c) (3, 2) d) (–2, –3)

20. The focii of hyperbola $4x^2 - 9y^2 - 36 = 0$ are
a) $(\pm\sqrt{13}, 0)$ b) $(\pm\sqrt{11}, 0)$ c) $(\pm\sqrt{12}, 0)$ d) $(0, \pm\sqrt{12})$

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21. Let A $(\alpha, 0)$ and B $(0, \beta)$ be the points on the line $5x + 7y = 50$. Let the point P divide the line segment AB internally in the ratio 7 : 3. Let $3x - 25 = 0$ be a directrix of the ellipse E : $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the corresponding focus be S. If from S, the perpendicular on the x-axis passes through P, then the length of the latus rectum of E is
a) $\frac{25}{3}$ b) $\frac{25}{9}$ c) $\frac{32}{9}$ d) $\frac{32}{5}$

22. If the length of the minor axis of an ellipse is equal to half of the distance between the foci, then the eccentricity of the ellipse is
a) $\frac{2}{\sqrt{5}}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{\sqrt{5}}{3}$ d) $\frac{\sqrt{3}}{2}$

23. For $0 < \theta < \frac{\pi}{2}$, if the eccentricity of the hyperbola $x^2 - y^2 \operatorname{cosec}^2\theta = 5$ is $\sqrt{7}$ times eccentricity of the ellipse $x^2 \operatorname{cosec}^2\theta + y^2 = 5$, then the value of θ is
a) $\frac{\pi}{6}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{3}$ d) $\frac{5\pi}{12}$

24. Let H : $-\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ be the hyperbola, whose eccentricity is $\sqrt{3}$ and the length of the latus rectum is $4\sqrt{3}$. Suppose the point $(\alpha, 6)$, $\alpha > 0$ lies on H. If β is the product of the focal distances of the point $(\alpha, 6)$, then $\alpha^2 + \beta$ is equal to
a) 169 b) 170 c) 171 d) 172