# PARABOLA ASSIGNMENT - II

**1.** The length of the latus rectum of the parabola $169\{(x-1)^2+(y-3)^2\}=(5x-12y+17)^2$ is

(a) $\frac{14}{13}$ (b) $\frac{28}{13}$ (c) $\frac{12}{13}$ (d) None of these

**2.** The length of the latus rectum of the parabola $x=ay^2+by+c$ is

(a) $\frac{a}{4}$ (b) $\frac{a}{3}$ (c) $\frac{1}{a}$ (d) $\frac{1}{4a}$

**3.** If the vertex = (2, 0) and the extremities of the latus rectum are (3, 2) and (3, –2), then the equation of the parabola is

(a) $y^2=2x-4$ (b) $x^2=4y-8$ (c) $y^2=4x-8$ (d) None of these

**4.** Let there be two parabolas with the same axis, focus of each being exterior to the other and the latus recta being 4*a* and 4*b*. The locus of the middle points of the intercepts between the parabolas made on the lines parallel to the common axis is a

(a) Straight line if $a=b$ (b) Parabola if $a\neq b$ (c) Parabola for all *a*, *b* (d) None of these

**5.** A line *L* passing through the focus of the parabola $y^2=4(x-1)$ intersects the parabola in two distinct points. If '*m*' be the slope of the line *L,* then

(a) $-1<m<1$ (b) $m<-1$ or $m>1$ (c) $m\in R$ (d) None of these

**6.** The tangents at three points A, *B*, *C* on the parabola $y^2=4x$ ; taken in pairs intersect at the points *P, Q* and *R*. If $\Delta,\Delta'$ be the areas of the triangles *ABC* and *PQR* respectively, then

(a) $\Delta=2\Delta'$ (b) $\Delta'=2\Delta$ (c) $\Delta=\Delta'$ (d) None of these

**7.** If the line $y=mx+a$ meets the parabola $y^2=4ax$ in two points whose abscissa are $x_1$ and $x_2$ , then $x_1+x_2$ is equal to zero if

(a) $m=-1$ (b) $m=1$ (c) $m=2$ (d) $m=-1/2$

**8.** Two tangents of the parabola $y^2=8x$ , meet the tangent at its vertex in the points *P* and *Q*. If $PQ=4$ , locus of the point of intersection of the two tangents is

(a) $y^2=8(x+2)$ (b) $y^2=8(x-2)$ (c) $x^2=8(y-2)$ (d) $x^2=8(y+2)$

**9.** If perpendicular be drawn from any two fixed points on the axis of a parabola at a distance *d* from the focus on any tangent to it, then the difference of their squares is

(a) $a^2-d^2$ (b) $a^2+d^2$ (c) $4ad$ (d) $2ad$

**10.** Two straight lines are perpendicular to each other. One of them touches the parabola $y^2=4a(x+a)$ and the other touches $y^2=4b(x+b)$ . Their point of intersection lies on the line

(a) $x-a+b=0$ (b) $x+a-b=0$ (c) $x+a+b=0$ (d) $x-a-b=0$

**11.** The point $(a,\ 2a)$ is an interior point of the region bounded by the parabola $y^2=16x$ and the double ordinate through the focus. Then *a* belongs to the open interval

(a) $a<4$ (b) $0<a<4$ (c) $0<a<2$ (d) $a>4$

**12.** The number of points with integral coordinates that lie in the interior of the region common to the circle $x^2+y^2=16$ and the parabola $y^2=4x$ is

(a) 8 (b) 10 (c) 16 (d) None of these

**13.** If the normals from any point to the parabola $x^2=4y$ cuts the line $y=2$ in points whose abscissae are in A.P., then the slopes of the tangents at the three co-normal points are in

(a) A.P. (b) G.P. (c) H.P. (d) None of these

**14.** If $x=my+c$ is a normal to the parabola $x^2=4ay$, then the value of *c* is

(a) $-2am-am^3$ (b) $2am+am^3$ (c) $-\frac{2a}{m}-\frac{a}{m^3}$ (d) $\frac{2a}{m}+\frac{a}{m^3}$

**15.** The normal at the point $P(ap^2,2ap)$ meets the parabola $y^2=4ax$ again at $Q(aq^2,2aq)$ such that the lines joining the origin to *P* and *Q* are at right angle. Then

(a) $p^2=2$ (b) $q^2=2$ (c) $p=2q$ (d) $q=2p$

**16.** If $y=2x+3$ is a tangent to the parabola $y^2=24x$ , then its distance from the parallel normal is

(a) $5\sqrt{5}$ (b) $10\sqrt{5}$ (c) $15\sqrt{5}$ (d) None of these

**17.** If $P(-3, 2)$ is one end of the focal chord *PQ* of the parabola $y^2 + 4x + 4y = 0$, then the slope of the normal at *Q* is

(a) $\frac{-1}{2}$ (b) 2 (c) $\frac{1}{2}$ (d) –2

**18.** The distance between a tangent to the parabola $y^2 = 4ax$ which is inclined to axis at an angle $\alpha$ and a parallel normal is

(a) $\frac{a\cos\alpha}{\sin^2\alpha}$ (b) $\frac{a\sin\alpha}{\cos^2\alpha}$ (c) $\frac{a}{\sin\alpha\cos^2\alpha}$ (d) $\frac{a}{\cos\alpha\sin^2\alpha}$

**19.** If the normal to the parabola $y^2 = 4ax$ at the point $P(at^2, 2at)$ cuts the parabola again at $Q(aT^2, 2aT)$, then

(a) $-2 \le \dot{T} \le 2$ (b) $T \in (-\infty, -8) \cup (8, \infty)$ (c) $T^2 < 8$ (d) $T^2 \ge 8$

**20.** If '$a$' and '$c$' are the segments of a focal chord of a parabola and *b* the semi-latus rectum, then

(a) $a, b, c$ are in A. P. (b) $a, b, c$ are in G. P. (c) $a, b, c$ are in H. P. (d) None of these

**21.** The locus of mid point of that chord of parabola which subtends right angle on the vertex will be

(a) $y^2 - 2ax + 8a^2 = 0$ (b) $y^2 = a(x - 4a)$ (c) $y^2 = 4a(x - 4a)$ (d) $y^2 + 3ax + 4a^2 = 0$

**22.** The HM of the segments of a focal chord of the parabola $y^2 = 4ax$ is

(a) $4a$ (b) $2a$ (c) $a$ (d) $a^2$

**23.** The length of a focal chord of the parabola $y^2 = 4ax$ at a distance *b* from the vertex is c. Then

(a) $2a^2 = bc$ (b) $a^3 = b^2c$ (c) $ac = b^2$ (d) $b^2c = 4a^3$

**24.** A chord $PP'$ of a parabola cuts the axis of the parabola at *O*. The feet of the perpendiculars from *P* and *P*' on the axis are *M* and *M*' respectively. If V is the vertex then *VM*, *VO*, *VM*' are in

(a) *A.P.* (b) *G.P.* (c) *H.P.* (d) None of these

**25.** The chord AB of the parabola $y^2 = 4ax$ cuts the axis of the parabola at C. If $A = (at_1^2, 2at_1)$; $B = (at_2^2, 2at_2)$ and $AC : AB = 1 : 3$, then

(a) $t_2 = 2t_1$ (b) $t_2 + 2t_1 = 0$ (c) $t_1 + 2t_2 = 0$ (d) None of these

**26.** The locus of the middle points of the focal chord of the parabola $y^2 = 4ax$ is

(a) $y^2 = a(x - a)$ (b) $y^2 = 2a(x - a)$ (c) $y^2 = 4a(x - a)$ (d) None of these

**27.** If $(4, -2)$ is one end of a focal chord of the parabola $y^2 = x$, then the slope of the tangent drawn at its other end will be

(a) $-\frac{1}{4}$ (b) –4 (c) 4 (d) $\frac{1}{4}$

**28.** If $(a_1, b_1)$ and $(a_2, b_2)$ are extremities of a focal chord of the parabola $y^2 = 4ax$, then $a_1a_2 =$

(a) $4a^2$ (b) $-4a^2$ (c) $a^2$ (d) $-a^2$

**29.** The equation of a circle passing through the vertex and the extremities of the latus rectum of the parabola $y^2 = 8x$ is

(a) $x^2 + y^2 + 10x = 0$ (b) $x^2 + y^2 + 10y = 0$ (c) $x^2 + y^2 - 10x = 0$ (d) $x^2 + y^2 - 5x = 0$

**30.** An equilateral triangle is inscribed in the parabola $y^2 = 4ax$, whose vertices are at the parabola, then the length of its side is equal to

(a) $8a$ (b) $8a\sqrt{3}$ (c) $a\sqrt{2}$ (d) None of these

**31.** The area of triangle formed inside the parabola $y^2 = 4x$ and whose ordinates of vertices are 1, 2 and 4 will be

(a) $\frac{7}{2}$ (b) $\frac{5}{2}$ (c) $\frac{3}{2}$ (d) $\frac{3}{4}$

**32.** The area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum is

(a) 12 sq. units (b) 16 sq. units (c) 18 sq. units (d) 24 sq. units

**33.** The vertex of the parabola $y^2 = 8x$ is at the centre of a circle and the parabola cuts the circle at the ends of its latus rectum. Then the equation of the circle is

(a) $x^2 + y^2 = 4$ (b) $x^2 + y^2 = 20$ (c) $x^2 + y^2 = 80$ (d) None of these

**34.** The circle $x^2 + y^2 + 2\lambda x = 0, \lambda \in R$, touches the parabola $y^2 = 4x$ externally. Then

(a) $\lambda > 0$ (b) $\lambda < 0$ (c) $\lambda > 1$ (d) None of these

**35.** The length of the common chord of the parabola $2y^2 = 3(x + 1)$ and the circle $x^2 + y^2 + 2x = 0$ is

(a) $\sqrt{3}$ (b) $2\sqrt{3}$ (c) $\frac{\sqrt{3}}{2}$ (d) None of these

**36.** The locus of the middle points of chords of a parabola which subtend a right angle at the vertex of the parabola is

(a) A circle (b) An ellipse (c) A parabola (d) None of these

**37.** $AB$ is a chord of the parabola $y^2 = 4ax$. If its equation is $y = mx + c$ and it subtends a right angle at the vertex of the parabola then

(a) $c = 4am$ (b) $a = 4mc$ (c) $c = -4am$ (d) $a + 4mc = 0$

**38.** The length of a focal chord of parabola $y^2 = 4ax$ making an angle $\theta$ with the axis of the parabola is

(a) $4a \operatorname{cosec}^2\theta$ (b) $4a \sec^2\theta$ (c) $a \operatorname{cosec}^2\theta$ (d) None of these

**39.** If (*a*, *b*) is the mid point of a chord passing through the vertex of the parabola $y^2 = 4x$, then

(a) $a = 2b$ (b) $2a = b$ (c) $a^2 = 2b$ (d) $2a = b^2$

**40.** The mid-point of the chord $2x + y - 4 = 0$ of the parabola $y^2 = 4x$ is

(a) $\left(\frac{5}{2}, -1\right)$ (b) $\left(-1, \frac{5}{2}\right)$ (c) $\left(\frac{3}{2}, -1\right)$ (d) None of these

**41.** If $P(at_1^2, 2at_1)$ and $Q(at_2^2, 2at_2)$ are two variable points on the curve $y^2 = 4ax$ and *PQ* subtends a right angle at the vertex, then $t_1t_2$ is equal to

(a) –1 (b) – 2 (c) –3 (d) –4

**42.** If $(at^2, 2at)$ are the coordinates of one end of a focal chord of the parabola $y^2 = 4ax$, then the coordinate of the other end are

(a) $(at^2, -2at)$ (b) $(-at^2, -2at)$ (c) $\left(\frac{a}{t^2}, \frac{2a}{t}\right)$ (d) $\left(\frac{a}{t^2}, \frac{-2a}{t}\right)$

**43.** If perpendiculars are drawn on any tangent to a parabola $y^2 = 4ax$ from the points $(a \pm k, 0)$ on the axis. The difference of their squares is

(a) 4 (b) $4a$ (c) $4k$ (d) $4ak$

**44.** The straight line $kx + y = 4$ touches the parabola $y = x - x^2$, if

(a) $k = -5$ (b) $k = 0$ (c) $k = 3$ (d) *k* takes any real value

**45.** If a tangent to the parabola $y^2 = ax$ makes an angle $45^o$ with *x*-axis, its points of contact will be

(a) $(a/2, a/4)$ (b) $(-a/2, a/4)$ (c) $(a/4, a/2)$ (d) $(-a/4, a/2)$

**46.** The equations of common tangent to the parabola $y^2 = 4ax$ and $x^2 = 4by$ is

(a) $xa^{1/3} + yb^{1/3} + (ab)^{2/3} = 0$ (b) $\frac{x}{a^{1/3}} + \frac{y}{b^{1/3}} + \frac{1}{(ab)^{2/3}} = 0$

(c) $xb^{\frac{1}{3}} + ya^{\frac{1}{3}} - (ab)^{\frac{2}{3}} = 0$ (d) $\frac{x}{b^{1/3}} + \frac{y}{a^{1/3}} - \frac{1}{(ab)^{2/3}} = 0$

**47.** The range of values of $\lambda$ for which the point $(\lambda, -1)$ is exterior to both the parabolas $y^2 = |x|$ is

(a) (0, 1) (b) (–1, 1) (c) (–1, 0) (d) None of these

**48.** The equation of the parabola, whose vertex is (–1, –2) axis is vertical and which passes through the point (3, 6)is

(a) $x^2 + 2x - 2y - 3 = 0$ (b) $2x^2 = 3y$ (c) $x^2 - 2x - y + 3 = 0$ (d) None of these

**49.** The length of the latus rectum of the parabola whose focus is $\left(\frac{u^2}{2g}\sin 2\alpha, -\frac{u^2}{2g}\cos 2\alpha\right)$ and directrix is $y = \frac{u^2}{2g}$, is

(a) $\frac{u^2}{g}\cos^2\alpha$ (b) $\frac{u^2}{g}\cos 2\alpha$ (c) $\frac{2u^2}{g}\cos 2\alpha$ (d) $\frac{2u^2}{g}\cos^2\alpha$

**50.** The equation of the parabola whose axis is vertical and passes through the points (0, 0), (3, 0) and (–1, 4), is

(a) $x^2 - 3x - y = 0$ (b) $x^2 + 3x + y = 0$ (c) $x^2 - 4x + 2y = 0$ (d) $x^2 - 4x - 2y = 0$