Q1. 21 January Shift 1

Let O be the vertex of the parabola $x^2 = 4y$ and Q be any point on it. Let the locus of the point P, which divides the line segment OQ internally in the ratio 2 : 3 be the conic C. Then the equation of the chord of C, which is bisected at the point $(1, 2)$, is :

(1) $5x - 4y + 3 = 0$
(2) $5x - y - 3 = 0$
(3) $4x - 5y + 6 = 0$
(4) $x - 2y + 3 = 0$

Q2. 21 January Shift 2

Let $y^2 = 12x$ be the parabola with its vertex at O. Let P be a point on the parabola and A be a point on the x-axis such that $\angle \mathrm{OPA} = 90^\circ$. Then the locus of the centroid of such triangles OPA is :

(1) $y^2 - 2x + 8 = 0$
(2) $y^2 - 9x + 6 = 0$
(3) $y^2 - 4x + 8 = 0$
(4) $y^2 - 6x + 4 = 0$

Q3. 21 January Shift 2

Let one end of a focal chord of the parabola $y^2 = 16x$ be $(16, 16)$. If $\mathrm{P}(\alpha, \beta)$ divides this focal chord internally in the ratio 5 : 2, then the minimum value of $\alpha + \beta$ is equal to :

(1) 16
(2) 5
(3) 7
(4) 22

Q4. 22 January Shift 1

If the chord joining the points $\mathrm{P}_1(x_1, y_1)$ and $\mathrm{P}_2(x_2, y_2)$ on the parabola $y^2 = 12x$ subtends a right angle at the vertex of the parabola, then $x_1x_2 - y_1y_2$ is equal to

(1) 284
(2) 280
(3) 288
(4) 292

Q5. 22 January Shift 2

Let the locus of the mid-point of the chord through the origin O of the parabola $y^2 = 4x$ be the curve S. Let P be any point on S. Then the locus of the point, which internally divides OP in the ratio 3 : 1, is :

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

Q6. 23 January Shift 2

An equilateral triangle OAB is inscribed in the parabola $y^2 = 4x$ with the vertex O at the vertex of the parabola. Then the minimum distance of the circle having AB as a diameter from the origin is

(1) $2(8 - 3\sqrt{3})$
(2) $2(3 + \sqrt{3})$
(3) $4(6 + \sqrt{3})$
(4) $4(3 - \sqrt{3})$

Q7. 24 January Shift 2

Let the image of parabola $x^2 = 4y$, in the line $x - y = 1$ be $(y + a)^2 = b(x - c)$, $a, b, c \in \mathrm{N}$. Then $a + b + c$ is equal to

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

Q8. 28 January Shift 2

Let A be the focus of the parabola $y^2 = 8x$. Let the line $y = \mathrm{m}x + \mathrm{c}$ intersect the parabola at two distinct points B and C. If the centroid of the triangle ABC is $\left(\frac{7}{3}, \frac{4}{3}\right)$, then $(BC)^2$ is equal to :

(1) 80
(2) 41
(3) 89
(4) 32

ANSWER KEYS

1. (1)	**2.** (1)	**3.** (3)	**4.** (3)	**5.** (3)	**6.** (4)	**7.** (2)	**8.** (1)