test

Roll Number - Name

1 Matching The Following

1) Match the following: $(\mathbf{3}, \mathbf{0})$ is the pt. from which three normals are drawn to the parabola $y^2 = 4x$ which meet the parabola in the points P, Q and R. Then (2006 - 6M)

Column I	**Column II**
a) Area of ΔPOR	a) 2
b) Radius of circumcircle of ΔPQR	b) $\frac{5}{2}$
c) Centroid of ΔPOR	c) $(\frac{\mathbf{5}}{\mathbf{2}}, \mathbf{0})$
d) Circumcentre of ΔPQR	d) $(\frac{\mathbf{2}}{\mathbf{3}}, \mathbf{0})$

2) Match the statements in Column I with the properties in Column II and indicate your answer by darkening the appropriate bubbles in the 4 x4 matrix given in the ORS (2007 -6 marks)

Column I	**Column II**
a) Two intersecting circles	a) have a common tangent
b) Twomutually external circles	b) havea common normal
c) Two circles, one strictly inside the other	c) do not have a common tangent
d) Two branches of a hyperbola	d) do not have a common normal

3) Match the conics in column 1with the statements/expressions in column 2 (2009)

Column I	**Column II**
a) Circle	a) The locus of the point $(\mathbf{h}, \mathbf{k})$ for which the lines $hx + ky = 1$ touches the circle $x^2 + y^2 = 4$
b) Parabola	b) Points z in the complex plane satisfying $\|z + 2\| - \|z - 2\| = \pm 3$
c) Ellipse	c) Points of the conic have parametric representations $x = \sqrt{3}(\frac{1-t^2}{1+t^2})$ ' $y = \frac{2t}{1+t^2}$
d) Hyperbola	d) The eccentricity of the conic lies in the interval $1 \leq x < \infty$

4) line L : $y = mx + 3$ meets y- axis at E$(\mathbf{0}, \mathbf{3})$ and the arc of the arc of the parabola $y^2 = 16x, 0 \leq y \leq 6$ at the point F$(\mathbf{x_o}, \mathbf{y_o})$. The tangent to the parabola at F$(\mathbf{x_o}, \mathbf{y_o})$ intersects the y-axis at G$(0, y_1)$. the slope m of the line L is chosen such that the

area of the triangle EFG has a local maximum. (JEE Adv. 2013)

Match List 1 with List 2 and select the correct answer using the code given below the list :

List 1	**List 2**
a) m=	a) $\frac{1}{2}$
b) Maximum area of ΔEFG	b) 4
c) y_o =	c) 2
d) y_1 =	d) 1

S no	P	Q	R	s
A	4	1	2	3
B	3	4	1	2
C	1	3	2	4
D	1	3	4	2

(Qs. 5-7) : By appropriately matching the information given in the three columns of the following table. Column 1,2, and 3 contain conics and points of contact, respectively

Sno	Column 1	Column 2	Column 3
A	$x^2 + y^2 = a^2$	$my = m^2x + a$	$(\frac{a}{m^2}), \frac{2a}{m}$
B	$x^2 + a^2y^2 = a^2$	$y = mx + a\sqrt{m^2 + 1}$	$(\frac{-ma}{\sqrt{m^2+1}}, \frac{a}{\sqrt{m^2+1}})$
C	$y^2 = 4ax$	$y = mx + \sqrt{a^2m^2 - 1}$	$(\frac{-a^2m}{\sqrt{a^2m^2+1}}, \frac{1}{\sqrt{a^2m^2+1}})$
D	$x^2 - a^2y^2 = a^2$	$y = mx + \sqrt{a^2m^2 - 1}$	$(\frac{-a^2m}{\sqrt{a^2m^2-1}}, \frac{-1}{\sqrt{a^2m^2-1}})$

5) For $a = \sqrt{2}$, if a tangent is drawn to a suitable conic (Column 1) at the point of contact $(-\mathbf{1}, \mathbf{1})$, then which of the following options is the only correct combination for obtaining its equation? (2009)

(a) $(I)(i)(P)$
(b) $(I)(ii)(Q)$
(c) $(II)(ii)(Q)$
(d) $(III)(i)(P)$

6) If a tangent to a suitable conic (column 1) is found to be y = x + 8 and its point of contact is $(\mathbf{8}, \mathbf{16})$, then which of the following options is the only correct combination? (JEE Adv. 2018)

(a) $(I)(ii)(Q)$
(b) $(II)(iv)(R)$
(c) $(III)(i)(P)$
(d) $(III)(ii)(Q)$

7) The tangent to a suitable conic(column 1) at $(\sqrt{3}, \frac{1}{2})$ is found to be $\sqrt{3}x + 2y = 4$, then which of the following options is the only correct option ?

(a) $(IV)(iii)(S)$
(b) $(IV)(iv)(S)$

(c) $(II)(iii)(R)$
(d) $(II)(iv)(R)$

8) Let H : $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, where $a > b > 0$, be a hyperbola in xy-plane whose conjugate axis LM subtends an angle of 60^0 at one of its vertices N. let the area of the triangle LMN be $4\sqrt{3}$.

List 1	**List 2**
a) The length of the conjugate axis of H is	a) 8
b) The eccentricity of H is	b) $\frac{4}{\sqrt{3}}$
c) The distance between the foci of H is	c) $\frac{2}{\sqrt{3}}$
d) The length of the latus rectum of H is	d) 4

The correct option from (A,B,C,D) is :

Sno	P	Q	R	S
A	4	2	1	3
B	4	3	1	2
C	4	1	3	2
D	3	4	2	1

2 Comprehension Based Questins

PASSAGE 1

Consider PASSAGE 3 the circle $x^2 + y^2 = 9$ and the parabola $y^2 = 8x$. They intersect at P and Q in the first and the fourth quadrants, respectively Tangents to the circle at P and Q intersect the x-axis at R and tangents to the parabola at P and Q intersect the x-axis at S

1) The ratio of the areas of the triangles PQS and POR is
(2007 - 4 marks)
(a) 1 : 2
(b) 1 : $\sqrt{2}$
(c) 1 : 4
(d) 1 : 8

2) The radius of the circumcircle of the triangle PRS is
(2007 - 4 marks)
(a) 5
(b) $3\sqrt{3}$
(c) $3\sqrt{2}$
(d) $(2\sqrt{3}$

3) The radius of the incircle of the triangle PQR is
(2007 - 4 marks)

(a) 4
(b) 3
(c) $\frac{8}{3}$
(d) 2

PASSAGE 2

The circle and Hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ - intersect at the points A,B. Then

4) Equation of a common tangent with positive slope to the circle as well as to the hyperbola is
(a) $2x - \sqrt{5}y - 20 = 0$
(b) $2x - \sqrt{5}y + 4 = 0$
(c) $3x - 4y + 8 = 0$
(d) $4x - 3y + 4 = 0$

5) Equation of the circle with AB as its diameter is
(a) $x^2 + y^2 - 12x + 24 = 0$
(b) $x^2 + y^2 + 12x + 24 = 0$
(c) $x^2 + y^2 + 12x - 24 = 0$
(d) $x^2 + y^2 - 12x - 24 = 0$

PASSAGE 3

Tangents are drawn from the point P(3, 4) to the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ touching the ellipse at points A and B. (2010)

6) The coordinates of A and B are
(a) $(\mathbf{3}, \mathbf{0}) and (\mathbf{2}, \mathbf{0})$
(b) $(\frac{-8}{5}, \frac{2\sqrt{161}}{15}) and (\frac{-9}{5}, \frac{8}{5})$
(c) $3x - 4y + 8 = 0$
(d) $4x - 3y + 4 = 0$

7) The orthocenter of the triangle PAB is
(a) $(\mathbf{5}, \frac{8}{7})$
(b) $(\frac{7}{5}, \frac{25}{8})$
(c) $(\frac{11}{5}, \frac{8}{5})$
(d) $(\frac{8}{25}, \frac{7}{5})$