# PART # 03 CO-ORDINATE GEOMETRY

# EXERCISE # 01

# SECTION-1 : (ONE OPTION CORRECT TYPE)

531.	The x <sup>2</sup> +	e co-ordinates of the point on the parabola $y^2 = 8x$ , which is at minimum distance from the circle $(y + 6)^2 = 1$ are		on the parabola y	which is at minimu	tance from the circle		
	(A)	(-2,4)	(B)	(2, -4)	(C)	(2, 4)	(D)	none of these
532.	The	values of k for whi	ch the	circles $x^2 + y^2 = 1$	and x <sup>2</sup>	$x^{2} + y^{2} - 4\lambda x + 8 = 0$	) have	two common tangents is
	(A)	$\left(-\frac{9}{4}, \frac{9}{4}\right)$			(B)	$\left(-\infty, -\frac{9}{4}\right) \cup \left(\frac{9}{4}, \right)$	$\infty$	
	(C)	$\left(-\infty, -\frac{9}{4}\right] \cup \left[\frac{9}{4}, \right]$	$\infty$		(D)	None of these		
533.	The	chords of the hype	erbola	$x^2 - y^2 = a^2$ touche	s para	bola $y^2 = 4ax$ , ther	n the lo	ocus of their mid-point is
	(A)	$y^{2}(a - x) = x^{3}$	(B)	$x^{2}(a + x) = y^{3}$	(C)	y² (x − a) = x³	(D)	$y^{2}(x + a) = x^{3}$
534.	Con: divid	sider a triangle AE les the sides of this	3C, wh s triang	ere B and C are ( gle in same ratio. T	(– a, 0 Then c	) and (a, 0) respe entroid of $\triangle PQR$ is	ctively s	. A be any point (h, k). P, Q, R
	(A)	(0, 0)	(B)	$\left(\frac{h}{3}, 0\right)$	(C)	$\left(0, \frac{k}{3}\right)$	(D)	$\left(\frac{h}{3}, \frac{k}{3}\right)$
535.	lf a f	ocal chord of the p	arabo	la y <sup>2</sup> = 4ax be at a	distan	ce d from the verte	ex, the	n its length is equal to
	(A)	$\frac{a^2}{d^2}$	(B)	$\frac{d^2}{a}$	(C)	$\frac{4a^3}{d^2}$	(D)	$\frac{2a^2}{d}$
536.	An e (A)	llipse slides betwe circle	en two (B)	perpendicular stra parabola	aight li (C)	nes, then the locuse ellipse	s of its (D) ł	e centre is nyperbola
537.	lf the (A) (C)	e normal to the par $-2 \le T \le 2$ $T^2 < 8$	abola	$y^2$ = 4ax at the point	nt P(al (B) (D)	$t^2$ , 2at) cuts the part T $\in (-\infty, -8) \cup$ T <sup>2</sup> ≥ 8	rabola (8, ∞)	again at $Q(aT^2, 2aT)$ , then
538.	lf the of th (A)	e tangents at P and e equation px <sup>2</sup> + 2 rational	d Q on qx + r (B)	a parabola meet i = 0 are real and equal	in R ar (C)	nd S be its focus. I imaginary	f p = S (D) r	SP, q = SR and r = SQ, the roots eal and unequal
539.	Equa	ation of the commo	on tang	gent to the curves	y <sup>2</sup> = 8x	and xy = – 1 is		
	(A)	3y = 9x + 2			(B)	y = 2x + 1		
	(C)	2y = x + 8			(D)	y = x + 2		
540.	The	tangent drawn fror	n (α, β	b) to an ellipse $\frac{x^2}{a^2}$	$+\frac{y^2}{b^2} =$	1 touches the circ	cle x <sup>2</sup> +	+ $y^2 = c^2$ , then the locus of $(\alpha, \beta)$
	is (A)	an ellipse	(B)	a circle	(C)	a parabola	(D)	none of these

**541.** Consider a point  $P(at^2, 2at)$  on the parabola  $y^2 = 4ax$ . A focal chord PS (S being focus) is drawn to meet parabola again at Q. From Q, a normal is drawn to meet parabola again at R. From R, a tangent is drawn to the parabola to meet focal chord PSQ (extended) at T. The area of  $\triangle QRT$  is

(A) 
$$8a^{2}\left(t^{2}+\frac{1}{t^{2}}\right)^{3}$$
 (B)  $a^{2}\left(t+\frac{1}{t}\right)^{4}$  (C)  $\frac{8a^{2}}{3}\left(t+\frac{1}{t}\right)^{3}$  (D) None of these

- **542.** Two pair of straight lines have the equations  $y^2 + xy 20 = 0$  and  $ax^2 + 2hxy + by^2 = 0$ . One line will be common among them if
  - (A) a = 8(h 2b) or a = -5(2h + 5b) (B) a = 4(h 2b) or a = -3(2h + 5b)
  - (C) a = 8(h 2b) or a = 5(2h + 5b) (D) None of these
- **543.** Let PQ, RS are the tangents at the extremities of a diameters PR of a circle of radius r such that PS, RQ intersect at a point X on the circumference of the circle, then 2r equals
  - (A)  $\frac{PQ+RS}{2}$  (B)  $\sqrt{PQ\cdot RS}$  (C)  $\frac{2PQ\cdot RS}{PQ+RS}$  (D)  $\sqrt{\frac{PQ^2+RS^2}{2}}$

544. If PQ is a double ordinate of the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  such that OPQ is an equilateral triangle. O being the

centre of the hyperbola, then the eccentricity e of the hyperbola satisfies

- (A)  $1 < e < \frac{2}{\sqrt{3}}$  (B)  $e = \frac{2}{\sqrt{3}}$  (C)  $e = \frac{\sqrt{3}}{2}$  (D)  $e > \frac{2}{\sqrt{3}}$
- **545.** An equilateral triangle is inscribed in the circle  $x^2 + y^2 = a^2$  with vertex (a, 0) the equation of the side opposite to the vertex is
  - (A) 2x a = 0 (B) x + a = 0(C) 2x + a = 0 (D) 3x - 2a = 0
- **546.** If the normal at any point P on an ellipse meets major and minor axis at G and G' and OF be the perpendicular drawn from centre O to this normal then PF. PG must be equal to
  - (A)  $b^2$  (B)  $a^2$
  - (C) ab (D) None of these
- 547. The diameter of the smallest circle which touches the line y = 3x 3 and passes through a point on the parabola  $y = x^2 + 7x + 2$

(A) 
$$\frac{1}{2\sqrt{5}}$$
 (B)  $\frac{1}{\sqrt{10}}$  (C)  $\frac{1}{\sqrt{2}}$  (D)  $\frac{1}{10}$ 

- **548.** If four distinct points of the curve  $y = 2x^4 + 7x^3 + 3x 5$  are collinear, then the A.M. of the x-co-ordinate of the four points is
  - (A)  $-\frac{7}{8}$  (B)  $\frac{3}{4}$  (C)  $\frac{7}{8}$  (D)  $-\frac{3}{4}$
- **549.** Given a fixed circle C and a line L through the centre O of C. Take a variable point P on L and let K be the circle centre P through O. Let T be the point where a common tangent to C and K meets K. The locus of T is
  - (A) a circle (B) a parabola
  - (C) a pair of straight lines (D) None of these

- **550.** If an ellipse slides between two perpendicular straight lines, then the point of intersection of these two lines lies on
  - (A) auxiliary circle of ellipse
  - (B) director circle of ellipse
  - (C) a line passes through centre of ellipse and perpendicular to axis of ellipse
  - (D) none of these

**551.** If a variable straight line  $x \cos \alpha + y \sin \alpha = p$  which is a chord of the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  (b > a) subtends a

right angle at the centre of the hyperbola then it always touches a fixed circle whose radius is

(A) 
$$\frac{a^2b^2}{\sqrt{b^2-a^2}}$$
 (B)  $\frac{ab}{\sqrt{a^2-b^2}}$  (C)  $\frac{ab}{\sqrt{b^2-a^2}}$  (D)  $\frac{ab}{b^2-a^2}$ 

- **552.** Equation of the circle of which the points (1, 2) and (2, 3) are the ends of a chord of segment containing an angle  $45^{\circ}$  is
  - (A)  $x^{2} + y^{2} 4x 4y + 7 = 0$ (B)  $x^{2} + y^{2} - 4x - 4y - 14 = 0$ (C)  $x^{2} + y^{2} + 4x + 4y + 7 = 0$ (D) none of these
- **553.** 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
  - (A) x = -a (B)  $x = \frac{a}{2}$  (C)  $x = -\frac{a}{2}$  (D) x = 0
- **554.** If the two circles  $(x 1)^2 + (y 3)^2 = r^2$  and  $x^2 + y^2 8x + 2y + 8 = 0$  intersect in two distinct points, then (A) r < 2 (B) r = 2 (C) r > 2 (D) 2 < r < 8

**555.** A line 3x - 4y + 4 = 0 is tangent to a circle whose radius is 3/4. If another straight line  $3x - 4y + \lambda = 0$  is also tangent to same circle, then value of  $\lambda$  is

(A)  $\frac{3}{4}$  (B)  $-\frac{7}{2}$  (C)  $-\frac{4}{3}$  (D)  $-\frac{2}{7}$ 

# SECTION-2 : (MORE THAN ONE OPTION CORRECT TYPE)

**556.** If the circle  $x^2 + y^2 - 9 = 0$  and  $x^2 + y^2 + 2\alpha x + 2y + 1 = 0$  touch each other, then  $\alpha$  is (A)  $-\frac{4}{3}$  (B) 0 (C) 1 (D)  $\frac{4}{3}$ 

557. If the ellipse  $\frac{x^2}{4} + y^2 = 1$  meets the ellipse  $x^2 + \frac{y^2}{a^2} = 1$  in four distinct points and  $a = b^2 - 5b + 7$  then b can take values (A)  $(-\infty, 0)$  (B) [4, 5] (C) [2, 3] (D)  $(0, \infty)$ 

**558.** The straight line x + y = 0, 3x + y - 4 = 0 and x + 3y - 4 = 0 form a triangle which is

- (A) isosceles (B) right -angled
- (C) obtuse angled (D) equilateral

**559.** The point P( $\alpha$ ,  $\alpha$  + 1) will lie inside the  $\triangle$ ABC whose vertices are A(0, 3), B(-2, 0) and C(6, 1) if

(A) 
$$\alpha = -1$$
 (B)  $\alpha = -\frac{1}{2}$  (C)  $\alpha = \frac{1}{2}$  (D)  $-\frac{6}{7} < \alpha < \frac{3}{2}$ 

**560.** Tangents are drawn from any point with eccentric angle  $\theta$  on the hyperbola  $\frac{x^2}{16} - \frac{y^2}{9} = 1$  to the circle  $x^2 + y^2 = 1$ 

16. If  $(x_1, y_1)$  is midpoint of chord of contact, then  $\theta$  is equal to

(A) 
$$\sec^{-1} \frac{4x_1}{(x_1^2 + y_1^2)}$$
 (B)  $\sec^{-1} \frac{16x_1^2}{(x_1^2 + y_1^2)}$   
(C)  $\tan^{-1} \frac{16y_1}{(x_1^2 + y_1^2)}$  (D)  $\tan^{-1} \frac{4y_1^2}{(x_1^2 + y_1^2)}$ 

$$(2) \quad \tan^2 3(x_1^2 + y_1^2) \quad (2) \quad \tan^2 (x_1^2 + y_1^2)$$

- **561.** Consider a circle with its 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
  - (A)  $\left(\frac{p}{2}, p\right)$  (B)  $\left(\frac{p}{2}, -p\right)$  (C)  $\left(\frac{p}{4}, p\right)$  (D)  $\left(\frac{p}{4}, -p\right)$

562. The equation of the circle which touches the axes of coordinates and the line  $\frac{x}{3} + \frac{y}{4} = 1$  and whose centre lies in the first quadrant is  $x^2 + y^2 - 2cx - 2cy + c^2 = 0$  where c is (A) 1 (B) 2 (C) 3 (D) 6

**563.** The points one line x = 2 from which tangents drawn to circle  $x^2 + y^2 = 16$  are at right angles is (are)

- (A)  $(2, 2\sqrt{7})$  (B)  $(2, 2\sqrt{5})$ (C)  $(2, -2\sqrt{7})$  (D)  $(2, -2\sqrt{5})$
- **564.** The line(s) tangents to the curve  $y = x^2 x$ 
  - (A) x y = 0 (B) x + y = 0 (C) x y = 1 (D) x + y = 1

**565.** The area of a triangle formed by tangent at any point on the curve and co-ordinate axes is constant, then the curve may be

- (A) a straight line (B) a circle
- (C) a parabola (D) a hyperbola
- **566.** The equation of a circle is  $S_1 \equiv x^2 + y^2 = 1$ . The orthogonal tangents to  $S_1$  meet at another circle  $S_2$  and orthogonal tangents to  $S_2$  meet at the third circle  $S_3$ , then
  - (A) radius of S<sub>2</sub> and S<sub>3</sub> are in the ratio 1 :  $\sqrt{2}$  (B) radius of S<sub>2</sub> and S<sub>3</sub> are in the ratio 1 : 2
  - (C) the circles  $S_1$ ,  $S_2$  and  $S_3$  are concentric (D) None of these

**567.** If the area of the quadrilateral formed by the tangents from the origin to the circle  $x^2 + y^2 + 6x - 8y + \lambda = 0$  and the pair of radii at the point of contact of these tangent to the circle is  $2\sqrt{6}$  sq. units, then the value of  $\lambda$  must be

(A)  $4\sqrt{6}$  (B) 24 (C) 1 (D)  $12\sqrt{6}$ 

The locus of the point of intersection of the tangents at the extremities of the chord of the circle  $x^2 + y^2 = a^2$ 568. which touches the circle  $x^2 + y^2 - 2ax = 0$  passes through the point  $\left(\frac{a}{2}, 0\right)$ (B)  $\left(0, \frac{a}{2}\right)$ (A) (C) (0, a) (D) (a, 0) The equation of the tangent to the hyperbola  $3x^2 - y^2 = 3$  parallel to the line y = 2x + 4 is 569. (A) y = 2x + 3(B) y = 2x + 1(D) y = 2x + 2(C) y = 2x - 1From a point P, the chord of contact to the ellipse  $\frac{x^2}{a} + \frac{y^2}{b} = (a+b)$  ...(1) 570. touches the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  ...(2) then the locus of the point P is (B) auxillary circle of (2) (D)  $x^{2} + y^{2} = a^{2} + b^{2}$ (A) director circle of (1) (C)  $x^2 + y^2 = (a + b)^2$ The point (1, -3) is inside the circle S,  $S \equiv x^2 + y^2 - 8x + 4y + k = 0$ . What are the possible values of k if the 571. circle S neither touches the axes nor cuts them? (A) 5 (B) 6 (C) 7 (D) 8 AB and CD are two equal and parallel chords of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ . Tangents to the ellipse at A and B 572. intersect at P and at C and D at Q. The line PQ is bisected at the origin (A) passes through the origin (B) (C) cannot pass through the origin (D) is not bisected at the origin If the equation  $ax^2 - 6xy + y^2 + bx + cy + d = 0$  represents pair of lines whose slopes are m and m<sup>2</sup>, then value 573. of a is / are (A) a = -8 (B) a = 8 (D) a = -27 (C) a = 27 The tangent to the hyperbola,  $x^2 - 3y^2 = 3$  at the point  $(\sqrt{3}, 0)$  when associated with two asymptotes 574. constitutes : (A) isosceles triangle (B) an equilateral triangle (C) a triangles whose area is  $\sqrt{3}$  sq. units (D) a right isosceles triangle. Variable chords of the parabola  $y^2 = 4ax$  subtend a right angle at the vertex. Then: 575. (A) locus of the feet of the perpendiculars from the vertex on these chords is a circle (B) locus of the middle points of the chords is a parabola

- (C) variable chords passes through a fixed point on the axis of the parabola
- (D) none of these

### **SECTION - 3: (COMPREHENSION TYPE)**

#### **COMPREHENSION-1**

#### Paragraph for Questions Nos. 576 to 578

The straight line(s) which passes through a given point (a, b) and make a given angle  $\alpha$  with the given straight line y = mx + c where m = tan  $\theta$  [(0 <  $\theta$  < 90°) and  $\alpha \neq 0$ , 90°], then

576. How many such lines are possible (B) (C) infinite (D) None of these (A) one two 577. If  $\beta$  is the angle made by the line L with positive direction of x-axis, then tan  $\beta$  is equal to  $tan \alpha + m$  $tan \alpha + m$  $m - tan \alpha$  $m - tan \alpha$ (B) (C) (D) (A)  $1 - m \tan \alpha$  $1 - m tan \alpha$  $\tan \alpha - m$  $m + tan \alpha$ 578. The equation of line L is (B)  $(y-b) = \frac{\tan \alpha + m}{\tan \alpha - m} (x-a)$ (A)  $(y-b) = \frac{m+\tan\alpha}{1+m\tan\alpha} (x-a)$ 

(C) 
$$(y-b) = \frac{m-\tan \alpha}{m+\tan \alpha} (x-a)$$
 (D)  $(y-b) = \frac{m-\tan \alpha}{1+m\tan \alpha} (x-a)$ 

#### **COMPREHENSION-2**

#### Paragraph for Questions Nos. 579 to 581

A boy moving along the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  at each and every point of it he is drawing a tangent and finding the area of triangle formed by it with co-ordinate axes at point P, Q, R and S starting from positive axis anticlockwise. He found that area of triangle is  $\geq$  m and is m at P, Q, R and S.

#### **579.** The co-ordinate of point Q are

(A) 
$$\left(\frac{a}{\sqrt{2}}, \frac{b}{\sqrt{2}}\right)$$
  
(B)  $\left(-\frac{a}{\sqrt{2}}, \frac{b}{\sqrt{2}}\right)$   
(C)  $\left(\frac{a}{\sqrt{2}}, -\frac{b}{\sqrt{2}}\right)$   
(D)  $\left(-\frac{a}{\sqrt{2}}, -\frac{b}{\sqrt{2}}\right)$ 

**580.** The area of  $\triangle$  formed by P, Q and S is

(A) ab (B) 
$$\pi$$
ab  
(C)  $\sqrt{ab}$  (D)  $\pi \sqrt{ab}$ 

581. Equation of normal to the ellipse at S is

(A) 
$$ax + by = \frac{b^2}{\sqrt{2}}$$
  
(B)  $ax + by = \frac{a^2 - b^2}{\sqrt{2}}$   
(C)  $bx + ay = \frac{a^2}{2}$   
(D)  $bx + ay = \frac{b^2 - a^2}{\sqrt{2}}$ 

#### Paragraph for Questions Nos. 582 to 584

Let an ellipse having major axis and minor axis parallel to x-axis and y-axis respectively. Its two foci S and S' are (2, 1), (4, 1) and a line x + y = 9 is a tangent to this ellipse at point P.

582. Eccentricity of the ellipse is

(A)	$\frac{1}{\sqrt{12}}$	(B)	$\frac{1}{\sqrt{13}}$
(C)	$\frac{1}{2}$	(D)	None of these

583. Length of major axis

(A)	√13	(B)	2√11
(C)	√52	(D)	2√12

584. The latus rectum of ellipse

(A)	<u>12</u> 13	(B)	$\frac{12}{\sqrt{13}}$
(C)	$\frac{24}{\sqrt{13}}$	(D)	$\frac{25}{\sqrt{13}}$

#### **COMPREHENSION-4**

#### Paragraph for Questions Nos. 585 to 587

Perpendiculars are drawn from the focus S of the parabola  $y = ax^2 + bx + c$  upon the tangents to the parabola at the points A(-1, 0) and B(1, 2) meeting them at the point C $\left(-\frac{1}{4}, \frac{9}{4}\right)$  and D $\left(\frac{3}{4}, \frac{9}{4}\right)$  respectively.

- **585.** The co-ordinates of the focus are
  - (A)  $\left(\frac{1}{2}, \frac{9}{4}\right)$  (B)  $\left(\frac{1}{2}, 2\right)$  (C)  $\left(0, \frac{9}{4}\right)$  (D) (-1, 2)

**586.** The normals at A and B intersect at a point P. The foot of the third normal through the point P is

(A) 
$$\left(\frac{1}{2}, \frac{9}{4}\right)$$
 (B)  $\left(-\frac{1}{2}, \frac{5}{4}\right)$  (C)  $(0, 2)$  (D)  $\left(\frac{3}{2}, \frac{5}{4}\right)$ 

587. Area of the region bounded by the parabola and the x- axis is

(A) 
$$\frac{5}{4}$$
 (B) 5

(C) 
$$\frac{5}{2}$$
 (D)  $\frac{9}{2}$ 

#### Paragraph for Questions Nos. 588 to 590

Consider an ellipse  $\frac{x^2}{4} + y^2 = \alpha$ ; ( $\alpha$  is parameter > 0) and a parabola  $y^2 = 8x$ . If a common tangent to the ellipse and the parabola meets the co-ordinate axes at A and B respectively, then

**588.** Locus of mid point of AB is

- (A)  $y^2 = -2x$
- (B)  $y^2 = -x$
- (C)  $y^2 = -\frac{x}{2}$
- (D)  $\frac{x^2}{4} + \frac{y^2}{2} = 1$

**589.** If the eccentric angle of a point on the ellipse where the common tangent meets it is  $\left(\frac{2\pi}{3}\right)$ , then  $\alpha$  is equal to (A) 4 (B) 5

(C) 26 (D) 36

**590.** If two of the three normals drawn from the point (h, 0) on the ellipse to the parabola  $y^2 = 8x$  are perpendicular, then

(A) h = 2
(B) h = 3
(C) h = 4
(D) h = 6

#### **COMPREHENSION-6**

# Paragraph for Questions Nos. 591 to 593

Two straight lines rotate about two fixed points (-a, 0) and (a, 0). If they start from their position of coincidence such that one rotates at the rate double that of the other, then

591.	The µ (A) (C)	point (– a, 0) always lies inside the curve on the curve	(B) (D)	Outside the curve None of these
592.	Locu (A) (C)	s of the curve is circle parabola	(B) (D)	straight line ellipse
593.	Dista (A) (C)	nce of the point (a, 0) from the variable poi 0 3a	nt on t (B) (D)	he curve is 2a 4a

#### Paragraph for Questions Nos. 594 to 596

Consider a point P on a parabola such that 2 of the normals drawn from it to the parabola are at right angles on parabola, then

**594.** If the equation of parabola is  $y^2 = 8x$ , then locus of P is

(A)	$x^2 = 4 (y - 6)$	(B)	y <sup>2</sup> = 2 (x – 6)
(C)	y <sup>2</sup> = 8 (x – 6)	(D)	$2x^2 = (y - 6)$

595. The ratio of latus rectum of given parabola and that of made by locus of point P is

(A)	4 : 1	(B)	2:1
(C)	16 : 1	(D)	1:1

**596.** If  $P \equiv (x_1, y_1)$ , the slope of third normal is

(A)	<u>y<sub>1</sub> 8</u>	(B)	<u>y<sub>1</sub></u> 2
(C)	$-\frac{y_1}{8}$	(D)	$-\frac{y_{1}}{2}$

#### **COMPREHENSION-8**

#### Paragraph for Questions Nos. 597 to 599

#### Read the following writeup carefully:

Observe the following facts for a parabola.

- (i) Axis of the parabola is the only line which can be the perpendicular bisector of the two chords of the parabola.
- (ii) If AB and CD are two parallel chords of the parabola and the normals at A and B intersect at P and the normals at C and D intersect at Q, then PQ is a normal to the parabola.
- **597.** The vertex of the parabola passing through (0, 1), (-1, 3), (3, 3) and (2, 1) is

(A)	$\left(1, \frac{1}{3}\right)$	(B)	$\left(\frac{1}{3}, 1\right)$
(C)	(1, 3)	(D)	(3, 1)

598. The directrix of the parabola is

(A) 
$$y - \frac{1}{24} = 0$$
  
(B)  $y + \frac{1}{24} = 0$   
(C)  $y + \frac{1}{12} = 0$   
(D)  $y - \frac{1}{12} = 0$ 

**599.** For the parabola  $y^2 = 4x$ , AB and CD are any two parallel chords having slope 1. C<sub>1</sub> is a circle passing through O, A and B and C<sub>2</sub> is a circle passing through O, C and D. C<sub>1</sub> and C<sub>2</sub> intersect at

- (A) (4, -4) (B) (-4, 4)
- (C) (4, 4) (D) (-4, -4)

# Paragraph for Questions Nos. 600 to 602

To the circle  $x^2 + y^2 = 4$  two tangents are drawn from P(-4, 0), which touches the circle at T<sub>1</sub> and T<sub>2</sub> and a rhombus PT<sub>1</sub> P'T<sub>2</sub> is completed.

600.Circum centre of the triangle  $PT_1T_2$  is at<br/>(A) (-2, 0)<br/>(C)  $\left(\frac{\sqrt{3}}{2}, 0\right)$ (B) (2, 0)<br/>(D)(C)  $\left(\frac{\sqrt{3}}{2}, 0\right)$ (D) None of these601.Ratio of the area of triangle  $PT_1P'$  to that the  $P'T_1T_2$  is

		0	•	· -	
(A)	2:1			(B)	1:2
(C)	√ <u>3</u> : 2			(D)	None of these

602. If P is taken to be at (h, 0) such that P' lies on the circle, the area of the rhombus is

(A)  $6\sqrt{3}$ (B)  $2\sqrt{3}$ (C)  $3\sqrt{3}$ (D) None of these

#### **COMPREHENSION-10**

#### Paragraph for Questions Nos. 603 to 605

A circle C whose radius is 1 unit, touches the x-axis at point A. The centre Q of C lies in first quadrant. The tangent from origin O to the circle touches it at T and a point P lies on it such that  $\triangle OAP$  is a right angled triangle at A and its perimeter is 8 units.

**603.** The length of QP is

(A)	$\frac{1}{2}$	(B)	$\frac{4}{3}$
(C)	$\frac{5}{3}$	(D)	None of these.

604. Equation of circle C is

(A)  $\{x - (2 + \sqrt{3})\}^2 + (y - 1)^2 = 1$ 

(C) 
$$(x - \sqrt{3})^2 + (y - 2)^2 = 1$$

(B)  ${x - (\sqrt{3} + \sqrt{2})}^2 + (y - 1)^2 = 1$ 

(D) None of these.

**605.** Equation of tangent OT is

$$(A) \qquad x - \sqrt{3}y = 0$$

(C)  $y - \sqrt{3}x = 0$ 

 $(B) \qquad x - \sqrt{2}y = 0$ 

(D) None of these

#### Paragraph for Questions Nos. 606 to 608

If a circle with centre  $C(\alpha, \beta)$  intersects a rectangular hyperbola with centre L (h, k) at four points  $P(x_1, y_1)$ ,  $Q(x_2, y_2)$ ,  $R(x_3, y_3)$  and  $S(x_4, y_4)$ , then the mean of the four points P, Q, R, S is the mean of the points C and L. In other words, the mid-point of CL coincides with the mean point of P, Q, R, S. Analytically

$$\frac{x_1 + x_2 + x_3 + x_4}{4} = \frac{\alpha + h}{2}; \ \frac{y_1 + y_2 + y_3 + y_4}{4} = \frac{\beta + k}{2}.$$

- **606.** Five points are selected on a circle of radius a. The centres of the rectangular hyperbolas, each passing through four of these points lie on a circle of radius
  - (A) a (B) 2a (C)  $\frac{a}{\sqrt{2}}$  (D)  $\frac{a}{2}$

**607.** A, B, C and D are the points of intersection of a circle and a rectangular hyperbola which have different centres. If AB passes through the centre of the hyperbola, then CD passes through

- (A) centre of the hyperbola (B) centre of the circle
- (C) mid-point of the centres of the circle and hyperbola
- (D) none of these
- **608.** A circle with fixed centre (3h, 3k) and of variable radius cuts the rectangular hyperbola  $x^2 y^2 = 9a^2$  at the points A, B, C, D. The locus of the centroid of the triangle ABC is given by
  - (A)  $(x 2h)^2 (y 2k)^2 = a^2$ (B)  $(x - h)^2 - (y - k)^2 = a^2$ (C)  $\frac{x^2}{h^2} - \frac{y^2}{k^2} = a^2$ (D)  $\frac{x^2}{h^2} + \frac{y^2}{k^2} = a^2$

#### **COMPREHENSION-12**

#### Paragraph for Questions Nos. 609 to 611

The vertices of a  $\triangle$ ABC lies on a rectangular hyperbola such that the orthocentre of the triangle is (3, 2) and the asymptotes of the rectangular hyperbola are parallel to the coordinate axis. If the two perpendicular tangents of the hyperbola intersect at the point (1, 1).

- 609. The equation of the asymptotes is
  - (A) xy 1 = x y (B) xy + 1 = x + y
  - (C) 2xy = x + y (D) None of these
- **610.** Equation of the rectangular hyperbola is
  - (A) xy = 2x + y 2
  - (B) 2xy = x + 2y + 5
  - (C) xy = x + y + 1
  - (D) None of these
- 611. Number of real normals that can drawn from the point (1, 1) to the rectangular hyperbola is
  - (A) 4 (B) 0
  - (C) 3 (D) 2

#### Paragraph for Questions Nos. 612 to 614

Let ABCD be a parallelogram whose diagonals equations are AC: x + 2y = 3; BD: 2x + y = 3. If length of diagonal AC = 4 units and area of ABCD = 8 sq. units.

612. The length of other diagonal BD is

(A) $\frac{10}{3}$ (B) 2 (C) $\frac{20}{3}$ (D) None of
---

613. The length of side AB is equal to

(A)  $\frac{2\sqrt{58}}{3}$  (B)  $\frac{4\sqrt{58}}{9}$  (C)  $\frac{3\sqrt{58}}{9}$  (D)  $\frac{4\sqrt{58}}{9}$ 

**614.** The length of BC is equal to

(A)	$\frac{2\sqrt{10}}{3}$	(B)	$\frac{4\sqrt{10}}{3}$
(C)	$\frac{8\sqrt{10}}{3}$	(D)	None of these

#### **COMPREHENSION-14**

#### Paragraph for Questions Nos. 615 to 617

A coplanar beam of light emerging from a point source have equation  $\lambda x - y + 2(1 + \lambda) = 0$ ,  $\lambda \in \mathbb{R}$ . the rays of the beam strike an elliptical surface and get reflected. The reflected rays form another convergent beam having equation  $\mu x - y + 2(1 - \mu) = 0$ ,  $\mu \in \mathbb{R}$ . Further it is found that the foot of the perpendicular from the point (2, 2) upon any tangent to the ellipse lies on the circle  $x^2 + y^2 - 4y - 5 = 0$ .

615. The eccentricity of the ellipse is equal to

(A)	$\frac{1}{3}$	(B)	$\frac{1}{\sqrt{3}}$
(C)	$\frac{2}{3}$	(D)	$\frac{1}{2}$

- **616.** The area of the largest triangle that an incident ray and the corresponding reflected ray can enclose with the axis of the ellipse is equal to
  - (A)  $4\sqrt{5}$  (B)  $2\sqrt{5}$
  - (C)  $\sqrt{5}$  (D) None of these
- **617.** Total distance travelled by an incident ray and the corresponding reflected ray is the least if the point of incidence coincides with
  - (A) an end of the minor axis (B) an end of the major axis
  - (C) an end of the latus rectum (D) None of these

# Paragraph for Questions Nos. 618 to 620

A circular arc of radius 2 units subtend an angle of x radians at the centre O such that  $x \in \left(0, \frac{\pi}{2}\right)$ . Tangents at the end points P and Q of the arc intersect at R. Let f(x) be the area of triangle PQR and let  $\phi(x)$  be the area of region enclosed by the chord PQ and the arc PQ.

	(A) tan <mark>x</mark>	(B)	$2 \tan \frac{x}{2}$	(C)	$2 \sec \frac{x}{2}$	(D)	$2 \cot \frac{x}{2}$
619.	$\boldsymbol{\varphi}(\boldsymbol{x})$ will be given by						
	(A) x – sinx	(B)	2(x – sinx)	(C)	$\frac{x}{2}$ - tan $\frac{x}{2}$	(D)	$\tan \frac{x}{2} \sec \frac{x}{2}$
620.	$\lim_{x\to 0} \frac{\phi(x)}{f(x)} \text{ is equal to}$						
	(A) $\frac{4}{3}$	(B)	$\frac{3}{4}$	(C)	$\frac{2}{3}$	(D)	$\frac{3}{2}$

# SECTION - 4 (MATRIX MATCH Type)

**621.** Match the following:

List – I	List – II
(A) The length of latus rectum of parabola $2y^2 + 3y - 4x - 3 = 0$ is	(i) 3/4
(B) The length of tangent from point $(0, -1)$ to the circle $\frac{(x-3)^2}{5^2} + \frac{(y-4)^2}{5^2} = 1$ is	(ii) 2
(C) The length of shortest focal chord of parabola $y^2 = 4x - 3$ is	(iii) 3
(D) Straight line with slope m represents the locus of middle points of chords of hyperbola $3x^2 - 2y^2 + 4x - 6y = 0$ parallel to $y = 2x$ , then m is	(iv) 4

#### 622. Match the following:

List – I	List – II
(A) The length of common chord of the ellipse $\frac{(x-1)^2}{9} + \frac{(y-2)^2}{4} = 1$ and circle	(i) 0
$(x-1)^2 + (y-2)^2 = 1$ is	
(B) $\operatorname{cosec}^2 A \cdot \cot^2 A - \sec^2 A \cdot \tan^2 A - (\cot^2 A - \tan^2 A) (\sec^2 A \csc^2 A - 1)$	(ii) 1
is	
(C) If $a \neq p$ , $b \neq q$ , $c \neq r \begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$ ,	(iii) 2
then $\frac{p}{p-a} + \frac{q}{q-b} + \frac{r}{r-1}$ is equal to	
(D) The circle $x^2 + y^2 = 4x - 7y + 12 = 0$ cuts an intercept on y-axis of length	(iv) 3

### **623.** Match the following:

List – I	List – I
(A) The value of 'a' for which the image of point $(a, a, -1)$ w.r.t. the	(i) 3
line mirror $3x + y = 6a$ is is the point $(a^2 + 1, a)$ is	
(B) The normal chord at a point 't' on the parabola $16y^2 = x$ subtends	(ii) 2
right angle at the vertex. Then $t^2$ is equal to	
(C) If e and e' be the eccentricity of a hyperbola and its conjugate.	(iii) 5
Then $\frac{1}{e^2} + \frac{1}{e'^2} =$	
(D) The shortest distance between parabola $y^2 = 4x$ and circle $x^2 + y^2 + y^2$	(iv) 1
$6x - 12y + 20 = 0$ is $4\sqrt{2} - A$ . The A is	

#### **624.** Match the following:

List – I	List – II
(A) Let $\alpha = \lim_{m \to \infty} \lim_{n \to \infty} \cos^{2m} \angle n\pi x$ , where x is rational, $\beta = \lim_{m \to \infty} \lim_{n \to \infty} \cos^{2m} \angle n\pi x$ ,	(i) 56
where x is irrational, then the area of the triangle having vertices ( $\alpha$ , $\beta$ ), (-2, 1)	
and (2, 1) is	
(B) If the circumference of the circle $x^2 + y^2 + 8x + 8y - b = 0$ is bisected by the circle	(ii) 2
$x^{2} + y^{2} - 2x + 4y + a = 0$ , then $ a + b  =$	
(C) Given a circle of radius 3, tangents are drawn from points A and B lying on one of	(iii) 90
its diameters which meet at a point P lying on another diameter perpendicular to the	
other diameter. The minimum area of triangle PAB is	
(D) If the radius of the circle $(x - 1)^2 + (y - 2)^2 = 1$ and $(x - 7)^2 + (y - 10)^2 = 4$ are	(iv) 18
increasing uniformly w.r.t. time as 0.3 and 0.4 unit/sec, if they touch each other	
internally after t sec. then t is equal to	

# **625.** Match the following:

ABC be a triangle with a = 3, b = 4, c = 5

List– I	List-II
(A) Distance between circumcentre and orthocentre	(i) 1/3
(B) Distance between centroid and circumcentre	(ii) 5/2
(C) Distance between centroid and incentre	(iii) 5/6
(D) Distance between centroid and orthocentre	(iv) 5/3

626. Match the following curve with their corresponding orthogonal trajectory

List – I	List – II
(A) $ay^2 = x^3$	(i) $y = kx$
(B) $y = ax^2$	(ii) $y^{2/3} - x^{2/3} = c$
(C) $x^{2/3} + y^{2/3} = a^{2/3}$	(iii) $y^{2/3} + x^{2/3} = c$
(D) $x^2 + y^2 = a^2$	(iv) $2y^2 + x^2 = c$
	(v) $3y^2 + 2x^2 = c$

#### **627.** Match the following

List – I		List – II
For a rectangular hyperbola $xy = c^2$ (c is purely imaginary) if a point on it	(i)	3
is $(a, \alpha)$ where 'a' is a positive number, $\alpha$ can take value		
If sides of a triangle are in A.P. and $(a - b + c)s = kb^2$ (where s is the semi	(ii)	$1 - \sqrt{3}$
perimeter) then k is equal to	(11)	2
Radius of the circle having centre (3, 4) and touching the circle $x^2 + y^2 = 4$	(iii)	17
can be		
Maximum distance of any point on the circle $(x-7)^2 + (y-2\sqrt{30})^2 = 16$	(iv)	$\frac{3}{2}$
from the centre of the ellipse $25x^2 + 16y^2 = 400$ is		2
	<b>List – I</b> For a rectangular hyperbola $xy = c^2$ (c is purely imaginary) if a point on it is (a, $\alpha$ ) where 'a' is a positive number, $\alpha$ can take value If sides of a triangle are in A.P. and $(a - b + c)s = kb^2$ (where s is the semi perimeter) then k is equal to Radius of the circle having centre (3, 4) and touching the circle $x^2 + y^2 = 4$ can be Maximum distance of any point on the circle $(x - 7)^2 + (y - 2\sqrt{30})^2 = 16$ from the centre of the ellipse $25x^2 + 16y^2 = 400$ is	List – I(i)For a rectangular hyperbola $xy = c^2$ (c is purely imaginary) if a point on it is (a, $\alpha$ ) where 'a' is a positive number, $\alpha$ can take value(i)If sides of a triangle are in A.P. and $(a - b + c)s = kb^2$ (where s is the semi perimeter) then k is equal to(ii)Radius of the circle having centre (3, 4) and touching the circle $x^2 + y^2 = 4$ can be(iii)Maximum distance of any point on the circle $(x - 7)^2 + (y - 2\sqrt{30})^2 = 16$ from the centre of the ellipse $25x^2 + 16y^2 = 400$ is(iv)

#### 628. Match the following

- (A) The number of rational points on the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$  is (1)  $\infty$
- (B) Number of integral points on the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$  is (2) 4
- (C) Number of rational points on the curve  $\frac{x^2}{3} + y^2 = 1$  is (3) 0

(D) Number of integral points on the curve 
$$\frac{x^2}{3} + y^2 = 1$$
 is (4) 2

#### **629.** Match the following:

List – I	List – II
(A) The triangle PQR is inscribed in the circle $x^2 + y^2 = 169$ . If Q and R have	<i>(</i> i) <sup>π</sup>
coordinates (5, 12) and (–12, 5) respectively find $\angle$ QPR	$(1) \frac{1}{4}$
(B) What is the angle between the line joining origin to the point of intersection of	(ii) <sup>π</sup>
the line $4x + 3y = 24$ with circle $(x - 3)^2 + (y - 4)^2 = 25$	$\frac{(1)}{2}$
(C) Two parallel tangents drawn to given circle are cut by a third tangent. The	(iii) π
angle subtended by the third tangent at the centre is	
(D) For a circle if a chord is drawn along the point of contact of tangents drawn	(iv) $\frac{\pi}{2}$
from a point P. If the chord subtends an angel $\frac{\pi}{2}$ then find the angle at P	6

#### **630.** Match the following:

List – I	List – II
(A) The normal at an end of a latusrectum of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ passes	(i) <u>1</u> 9
through an end of the minor axis if $e^4$ is equal to	
(B) PQ is a double ordinate of a parabola $y^2 = 4ax$ . If the locus of its points of	(ii) 1
trisection is another parabola length of whose latus rectum is k times the	(II) <u>–</u> a
length of the latus rectum of the given parabola then k is equal to	
(C) If e and e' are the distances of the extremities of any focal chord from the	(iii) 1
focus f of the parabola $y^2 = 4ax$ , then $\frac{1}{e} + \frac{1}{e'}$ is equal to	

(D) If e and e' be the eccentricities of a hyperbola and its conjugate, then (iv)  $1 - e^2$  $\frac{1}{e^2} + \frac{1}{e'^2}$  is equal to

#### **631.** Match the following:

	List – I	List – II
(A)	The equation of tangent to the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ which cuts off	, (i) √2
	equal intercepts on axes is $x - y = a$ where a equal to	
(B)	The normal $y = mx - 2am - am^3$ to the parabola $y^2 = 4ax$ subtends a	(ii) $\sqrt{3}$
	right angle at the vertex if m equals to	
(C)	The equation of the common tangent to parabola $y^2 = 4x$ and $x^2 = 4y$	(iii) <b>√8</b>
	is $x + y + \frac{k}{\sqrt{3}} = 0$ , then k is equal to	
(D)	An equation of common tangent to parabola $y^2 = 8x$ and the	(iv) $\sqrt{41}$
	hyperbola $3x^2 - y^2 = 3$ is $4x - 2y + \frac{k}{\sqrt{2}} = 0$ , then k is equal to	

**632.** The parabola  $y^2 = 4ax$  has a chord AB joining points A  $(at_1^2, 2at_1)$  and B $(at_2^2, 2at_2)$ . Then match the following

List – I	List – II
(A) AB is a normal chord	(i) $t_2 = -t_1 - \frac{1}{2}$
(B) AB is a focal chord	(ii) $t_2 = -\frac{4}{t_1}$
(C) AB subtends 90° at point (0, 0)	(iii) $t_2 = -\frac{1}{t_1}$
(D) AB is inclined at 45° to the axis of parabola	(iv) $t_2 = -t_1 - \frac{2}{t_1}$

# Section-5 : (INTEGER type)

- **633.** A point P moves in such a way that  $\frac{AP}{PB} = 3$  where A(1, 2) and B(3, 5), then maximum distance of P from A is
- **634.** The line L has intercepts 1 and 1/2 on the co-ordinate axes. When keeping the origin fixed, the co-ordinate axes are rotated through a fixed angle, if the same line has intercepts p and q on the rotates axes. Then 1 1 .
  - $\frac{1}{p^2} + \frac{1}{q^2}$  is \_\_\_\_\_
- **635.** If PSQ is the focal chord of the parabola  $y^2 = 8x$  such that SP = 6, then the length SQ is \_\_\_\_\_

- **636.** If the ellipse  $x^2 + 81y^2 81 = 0$  and the circle  $x^2 + y^2 9 = 0$  intersect an angle  $\theta$  in first quadrant, then the value of  $(-3 \tan \theta)$  is \_\_\_\_\_
- **637.** Let  $(x_i, y_i)$  where i = 1, 2, 3, 4 are the integral solutions of equation  $2x^2y^2 + y^2 6x^2 12 = 0$ . The area of quadrilateral whose vertices are  $(x_i, y_i)$ , i = 1, 2, 3, 4 is \_\_\_\_\_
- **638.** Square of diameter of the circle having tangent at (1, 1) as x + y 2 = 0 and passing through (2, 2) is
- **639.** If P be a point on ellipse  $4x^2 + y^2 = 8$  with eccentric angle  $\frac{\pi}{4}$ . Tangent and normal at P intersects the axes at A, B, A' and B' respectively, then the ratio of area of  $\triangle APA'$  and area of  $\triangle BPB'$  is \_\_\_\_\_\_.
- **640.** P is the positive extremity of the latus rectum of the ellipse  $\frac{x^2}{25} + \frac{y^2}{16} = 1$  and A is the positive major vertex and B is the positive minor vertex then the 10 times of the area bounded by BPA and chords BP and AP is
- **641.** The minimum of the distances from the point (0, 1) to the points of intersection of the lines  $(3\cos\theta + 4\sin\theta)x + (2\cos\theta + 2\sin\theta)y (5\cos\theta + 6\sin\theta) = 0$ , where different values of  $\theta$  gives different lines, is \_\_\_\_\_
- **642.** A line passes through the point P (2, 3) and makes an angle  $\theta$  with positive direction of x-axis. If it meets the lines represented by  $x^2 2xy y^2 = 0$  at the points A and B. If PA · PB = 17, then the value of  $\theta$  in degrees is
- 643. Six points  $(x_i, y_i)$ , i = 1, 2, ..., 6 are taken on the circle  $x^2 + y^2 = 4$  such that  $\sum_{i=1}^{6} x_i = 8$  and  $\sum_{i=1}^{6} y_i = 4$ . The line

segment joining orthocentre of a triangle made by any three points and the centroid of the triangle made by other three points passes through a fixed points (h, k), then h + k is \_\_\_\_\_

- **644.** The square of the length of the intercept on the normal at the point P(18, 12) of the parabola  $y^2 = 8x$  made by the circle on the line joining the focus and P as diameter, is \_\_\_\_\_
- **645.** The angle between the straight lines  $x \cos \alpha + y \sin \alpha = p$  and ax + by + p = 0 is  $\frac{\pi}{4}$ . They meet the straight line  $x \sin \alpha y \cos \alpha = 0$  in the same point, then the value of  $a^2 + b^2$  is \_\_\_\_\_
- **646.** Area of the rectangle formed by a asymptotes of the hyperbola xy 3y 2x = 0 and co-ordinate axes is
- **647.** The tangent at the point A(12, 6) to a parabola intersects its directrix at the point B(-1, 2). The focus of the parabola lies on x-axis. The number of such parabolas is
- **648.** The circle  $x^2 + y^2 = 4$  cuts the circle  $x^2 + y^2 2x 4 = 0$  at the point A and B. If the circle  $x^2 + y^2 4x k = 0$  passes through A and B, then the value of k is
- 649. If G is the centroid of  $\triangle ABC$  with vertices A(a, 0), B(- a, 0) and C(b, c) then  $\frac{AB^2 + BC^2 + CA^2}{GA^2 + GB^2 + GC^2}$  =
- **650.** A man running round a race course notes that the sum of the distance of two flag posts from him is always 10 meter and distance between flag posts is 8 m. The area of the path, he encloses (in square meters) is  $k\pi$ . What is the value of k?

# **Answer Key**

530         200         551         C         601           531         B         552         A         602         A           532         B         553         D         603         C           533         C         554         D         604         A           534         D         555         B         605         C           535         C         556         AD         606         D           536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           541         C         562         AD         612         C           544         D         563         AC         613         A           544         D         565         AD         615         C           544         A         567         BC         617         D           545         C         566         AC         616 </th <th>Qs.</th> <th>Ans.</th> <th>Qs.</th> <th>Ans.</th> <th>Qs.</th> <th>Ans.</th>	Qs.	Ans.	Qs.	Ans.	Qs.	Ans.
531         B         552         A         602         A           532         B         553         D         603         C           533         C         554         D         604         A           534         D         555         B         605         C           535         C         556         AD         606         D           536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         616         B           544         D         565         AD         615         C           545         C         566         AC         616         B           546         A         567         BC	530	200	551	С	601	
532         B         553         D         603         C           533         C         554         D         604         A           534         D         555         B         606         D           535         C         556         AD         606         D           536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           544         D         565         AD         615         C           545         C         566         AC         618         B           544         A         569         BC         619         B           542         C         570         AC <td>531</td> <td>В</td> <td>552</td> <td>А</td> <td>602</td> <td>A</td>	531	В	552	А	602	A
533         C         554         D         604         A           534         D         555         B         605         C           535         C         556         AD         606         D           536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           538         D         560         AC         610         C           540         A         561         AB         611         D           541         C         563         AC         613         A           543         B         564         AC         614         A           544         D         565         AD         615         C           545         C         566         AC         618         B           544         D         567         BC         619         B           544         A         569         BC         619         B           549         C         570         AC <td>532</td> <td>В</td> <td>553</td> <td>D</td> <td>603</td> <td>С</td>	532	В	553	D	603	С
534         D         555         B         605         C           536         C         556         AD         606         D           537         D         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           544         D         565         AD         615         C           543         C         566         AC         616         B           544         A         569         BC         617         D           545         C         570         AC         620         C           549         C         570         AC         620         C           550         B         571         ABCD	533	С	554	D	604	А
535         C         556         AD         606         D           536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           543         B         566         AC         616         B           544         D         565         AD         615         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(ii), D-(i)           573         BD         622         A-(i), B-(i), C-(i), D-(i)         575           573         BC	534	D	555	В	605	С
536         A         557         AB         607         B           537         D         558         AC         608         C           538         B         559         D         609         B           538         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           544         D         565         AD         615         C           546         A         567         BC         617         D           547         B         568         AC         618         C           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(ii), C-(iv), D-(i)           573         AB         622         A-(i), B-(ii), C-(iv), D-(i)         573         BD         623         A-(ii), B-(ii), C-(iv), D-(i)           574         BC         624         A-(ii), B-(i), C	535	С	556	AD	606	D
537         D         558         AC         608         C           538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           544         D         565         AD         615         C           544         D         566         AC         618         C           545         C         566         AC         618         C           546         A         567         BC         619         B           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(i), P-(i), D-(i)           573         BD         623	536	А	557	AB	607	В
538         B         559         D         609         B           539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           543         B         566         AC         616         B           544         D         565         AD         612         C           545         C         566         AC         616         B           546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(i), B-(i), C-(i), D-(i)           573         BD         623         A-(i), B-(i), C-(i), D-(i)           574         BC         624	537	D	558	AC	608	С
539         D         560         AC         610         C           540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           543         B         564         BC         614         A           544         D         565         AD         615         C           546         A         567         BC         617         D           546         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(ii), C-(iv), D-(i)           573         BD         623         A-(ii), B-(ii), C-(iv), D-(i)         575           575         AB         622         A-(ii), B-(i), C-(iv), D-(i)         575           576         B         626         A-(i), B-(i), C-(iv), D-(i)         575           577         A         627         -         -           578         D	538	В	559	D	609	В
540         A         561         AB         611         D           541         C         562         AD         612         C           542         A         563         AC         613         A           543         B         564         BC         614         A           544         D         565         AD         615         C           545         C         566         AC         616         B           546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(ii), D-(i)           573         BD         623         A-(i), B-(i), C-(i), D-(i)         575           576         B         626         A-(i), B-(i), C-(i), D-(i)         575           577         A         627         A-(i), B-(i), C-(i), D-(i)         581           587         <	539	D	560	AC	610	С
541         C         562         AD         612         C           542         A         563         AC         613         A           543         B         564         BC         614         A           544         D         565         AD         615         C           544         D         565         AD         615         C           544         A         567         BC         617         D           547         B         568         AC         618         C           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(ii), D-(i)           573         BD         623         A-(ii), B-(i), C-(i), D-(i)         575         ABC         625         A-(i), B-(i), C-(i), D-(i)           576         B         626         A-(i), B-(i), C-(i), D-(i)         575         ABC         628         A-(i), B-(i), C-(i), D-(i)           577         A         627          575         ABC         628         A-(i), B-(i), C-(i), D-(i)           578         D         628         A-(i	540	А	561	AB	611	D
542         A         563         AC         613         A           543         B         564         BC         614         A           544         D         565         AD         615         C           545         C         566         AC         616         B           544         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(iv), D-(ii)           573         BD         623         A-(i), B-(i), C-(v), D-(ii)         573           574         BC         624         A-(i), B-(i), C-(v), D-(ii)         574           575         ABC         622         A-(i), B-(i), C-(v), D-(ii)         577           576         B         626         A-(i), B-(i), C-(i), D-(i)         577           577         A         627         -         -           579         B	541	С	562	AD	612	С
543         B         564         BC         614         A           544         D         565         AD         615         C           545         C         566         AC         616         B           546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABC         621         A-(ii), B-(i), C-(ii), D-(i)           573         BD         623         A-(ii), B-(i), C-(ii), D-(i)         575           575         ABC         624         A-(i), B-(i), C-(i), D-(i)         575           575         ABC         625         A-(i), B-(i), C-(i), D-(i)         576           576         B         626         A-(i), B-(i), C-(i), D-(i)         577           578         D         628         A-(i), B-(i), C-(i), D-(i)         581           581         B         631         B         631           582         B<	542	А	563	AC	613	А
544         D         565         AD         615         C           545         C         566         AC         616         B           546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(iv), D-(ii)           573         BD         623         A-(ii), B-(i), C-(iv), D-(ii)         575           575         ABC         625         A-(ii), B-(i), C-(iv), D-(ii)         575           576         B         626         A-(i), B-(i), C-(iv), D-(ii)         577           577         A         627         -         578         D         628         A-(i), B-(i), C-(i), D-(1)           577         A         627         -         -         579         B         529         A-(i), B-(i), C-(i), D-(i)           581         B         631         -         -         -         -         - </td <td>543</td> <td>В</td> <td>564</td> <td>BC</td> <td>614</td> <td>А</td>	543	В	564	BC	614	А
545         C         566         AC         616         B           546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(iv), D-(i)           572         AB         622         A-(ii), B-(i), C-(iv), D-(i)         573         BD         623         A-(ii), B-(i), C-(iv), D-(i)           574         BC         624         A-(i), B-(i), C-(i), D-(i)         575         ABC         625         A-(i), B-(i), C-(i), D-(i)           576         B         626         A-(i), B-(i), C-(i), D-(i)         576         B         626         A-(i), B-(i), C-(i), D-(i)           578         D         628         A-(i), B-(i), C-(i), D-(i)         579         B         629         A-(i), B-(i), C-(i), D-(i)           581         B         631         -         -         50         585         585         585         585         58         633 <td>544</td> <td>D</td> <td>565</td> <td>AD</td> <td>615</td> <td>С</td>	544	D	565	AD	615	С
546         A         567         BC         617         D           547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(i), C-(iv), D-(i)           570         ABC         622         A-(i), B-(i), C-(iv), D-(i)         573           550         B         571         ABCD         623         A-(i), B-(i), C-(iv), D-(i)           573         BD         623         A-(i), B-(i), C-(iv), D-(i)         575           574         BC         624         A-(i), B-(i), C-(iv), D-(i)         576           576         B         626         A-(i), C-(i), D-(i)         577           578         D         628         A-(i), B-(i), C-(i), D-(i)         578           580         A         630         A-(iv), B-(ii), C-(ii), D-(ii)         581         B         631           582         B         633         -         582         B         633           584         C         634	545	С	566	AC	616	В
547         B         568         AC         618         C           548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(ii), C-(iv), D-(i)           572         AB         622         A-(ii), B-(i), C-(iv), D-(ii)           573         BD         623         A-(ii), B-(i), C-(iv), D-(iii)           574         BC         624         A-(ii), B-(i), C-(iv), D-(iii)           575         ABC         625         A-(i), B-(i), C-(i), D-(i)           576         B         626         A-(1), B-(2), C-(1), D-(3)           577         A         627         -           578         D         628         A-(i), B-(2), C-(1), D-(3)           579         B         629         A-(i), C-(ii), D-(ii)           580         A         630         A-(iv), B-(ii), C-(ii), D-(ii)           581         B         631         -           582         B         632         A-(iv), B-(ii), C-(ii), D-(i)           583         C         634         5           58	546	А	567	BC	617	D
548         A         569         BC         619         B           549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(ii), C-(iv), D-(i)           572         AB         622         A-(i), B-(i), C-(iv), D-(i)         573         BD         623         A-(ii), B-(i), C-(iv), D-(ii)           574         BC         624         A-(ii), B-(i), C-(iv), D-(ii)         574         BC         624         A-(ii), B-(i), C-(iv), D-(ii)           574         BC         624         A-(i), B-(i), C-(iv), D-(ii)         575         ABC         625         A-(i), B-(i), C-(i), D-(i)           576         B         626         A-(i), B-(i), C-(i), D-(i)         577         A         627           577         A         627         -         -         578         D         628         A-(i), B-(i), C-(i), D-(i)         579         B         629         A-(i), B-(i), C-(i), D-(i)         583         588         631         -         -         582         B         632         A-(iv), B-(i), D-(i)         583         584         C         633         -         -         583         585         585	547	В	568	AC	618	С
549         C         570         AC         620         C           550         B         571         ABCD         621         A-(ii), B-(iii), C-(iv), D-(i)           572         AB         622         A-(ii), B-(ii), C-(iv), D-(i)           573         BD         623         A-(ii), B-(i), C-(iv), D-(i)           574         BC         624         A-(ii), B-(i), C-(iv), D-(i)           575         ABC         625         A-(i), B-(), C-(i), D-(i)           576         B         626         (A), B-(), C-(i), D-(i)           577         A         627	548	А	569	BC	619	В
550         B         571         ABCD         621         A-(ii), B-(iii), C-(iv), D-(i)           572         AB         622         A-(ii), B-(i), C-(iii), D-(ii)           573         BD         623         A-(ii), B-(i), C-(iv), D-(ii)           574         BC         624         A-(ii), B-(i), C-(iv), D-(ii)           575         ABC         625         A-(ii), B-(i), C-(iv), D-(ii)           576         B         626         A-(i, B-(), C-(i), D-(i)           577         A         627	549	С	570	AC	620	С
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	550	В	571	ABCD	621	A-(ii), B-(iii), C-(iv), D-(i)
573BD623A-(ii), B-(ii), C-(iv), D-(iii)574BC624A-(ii), B-(i), C-(iv), D-(iii)575ABC625A-(i), B-(i), C-(iv), D-(iv)576B626A-(i), B-(i), C-(i), D-(i)577A627578D628A-(1), B-(2), C-(1), D-(3)579B629A-(i), B-(ii), C-(ii), D-(ii)580A630A-(iv), B-(i), C-(ii), D-(iii)581B631582B632A-(iv), B-(ii), C-(ii), D-(ii)583C633584C6345585B6353586D6368587D637116588638259064017591C6411592A64290593B6433594B64440595A6452596B6466597A6474598B6484599A6493600A65015			572	AB	622	A-(i), B-(i), C-(iii), D-(ii)
574BC $624$ $A-(ii), B-(i), C-(iv), D-(ii)$ $575$ $ABC$ $625$ $A-(ii), B-(i), C-(iv), D-(iv)$ $576$ B $626$ $A-(i), B-(i), C-(i), D-(i)$ $577$ $A$ $627$ $578$ D $628$ $A-(1), B-(2), C-(1), D-(3)$ $579$ B $629$ $A-(ii), B-(ii), C-(ii), D-(ii)$ $580$ $A$ $630$ $A-(iv), B-(ii), C-(ii), D-(ii)$ $581$ B $631$ $582$ B $632$ $A-(iv), B-(iii), C-(ii), D-(i)$ $583$ C $633$ $584$ C $634$ $585$ B $635$ $585$ B $635$ $586$ D $637$ $586$ D $637$ $590$ $640$ $17$ $591$ C $641$ $592$ A $642$ $90$ $593$ B $594$ B $644$ $40$ $595$ $596$ B $646$ $597$ A $647$ $4$ $598$ $599$ A $649$ $3$ $600$ A $650$ $15$			573	BD	623	A-(ii), B-(ii), C-(iv), D-(iii)
575ABC625A-(ii), B-(i), C-(iv), D-(iv)576B626A-(), B-(), C-(), D-()577A627578D628A-(1), B-(2), C-(1), D-(3)579B629A-(i), B-(ii), C-(ii), D-(ii)580A630A-(iv), B-(i), C-(ii), D-(iii)581B631582B632A-(iv), B-(iii), C-(ii), D-(ii)583C633584C6345585B6353586D6368587D637165886382589639459064017591C6411592A64290593B6433594B64440595A6452596B6466597A6474598B6484599A6493600A65015			574	BC	624	A-(ii), B-(i), C-(iv), D-(iii)
576B $626$ $A-(), B-(), C-(), D-()$ $577$ A $627$ $578$ D $628$ $A-(1), B-(2), C-(1), D-(3)$ $579$ B $629$ $A-(i), B-(i), C-(ii), D-(ii)$ $580$ A $630$ $A-(iv), B-(i), C-(ii), D-(ii)$ $580$ A $630$ $A-(iv), B-(i), C-(ii), D-(ii)$ $581$ B $631$ $582$ B $632$ $A-(iv), B-(iii), C-(ii), D-(i)$ $583$ C $633$ $584$ C $634$ 5 $585$ B $635$ 3 $586$ D $636$ 8 $587$ D $637$ $16$ $588$ $638$ 2 $589$ $639$ 4 $590$ $640$ $17$ $591$ C $641$ 1 $592$ A $642$ $90$ $593$ B $643$ 3 $594$ B $644$ $40$ $595$ A $645$ 2 $596$ B $646$ $6$ $597$ A $647$ 4 $598$ B $648$ 4 $599$ A $649$ 3 $600$ A $650$ $15$			575	ABC	625	A-(ii), B-(i), C-(iv), D-(iv)
577A $627$ $578$ D $628$ A-(1), B-(2), C-(1), D-(3) $579$ B $629$ A-(i), B-(i), C-(ii), D-(ii) $580$ A $630$ A-(iv), B-(i), C-(ii), D-(ii) $581$ B $631$			576	В	626	A-(), B-(), C-(), D-()
578D $628$ A-(1), B-(2), C-(1), D-(3) $579$ B $629$ A-(i), B-(ii), C-(ii), D-(ii) $580$ A $630$ A-(iv), B-(i), C-(ii), D-(ii) $581$ B $631$ $$			577	А	627	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			578	D	628	A-(1), B-(2), C-(1), D-(3)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			579	В	629	A-(i), B-(ii), C-(ii), D-(ii)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			580	A	630	A-(iv), B-(i), C-(ii), D-(iii)
582B $632$ A-(iv), B-(ii), C-(ii), D-(i) $583$ C $633$ $584$ C $634$ 5 $585$ B $635$ 3 $586$ D $636$ 8 $587$ D $637$ 16 $588$ $638$ 2 $589$ $639$ 4 $590$ $640$ 17 $591$ C $641$ 1 $592$ A $642$ 90 $593$ B $643$ 3 $594$ B $644$ 40 $595$ A $645$ 2 $596$ B $646$ 6 $597$ A $647$ 4 $598$ B $648$ 4 $599$ A $649$ 3 $600$ A $650$ 15			581	В	631	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			582	В	632	A-(iv), B-(iii), C-(ii), D-(i)
584C $634$ 5 $585$ B $635$ 3 $586$ D $636$ 8 $587$ D $637$ 16 $588$ $638$ 2 $589$ $639$ 4 $590$ $640$ 17 $591$ C $641$ 1 $592$ A $642$ 90 $593$ B $643$ 3 $594$ B $644$ 40 $595$ A $645$ 2 $596$ B $646$ $6$ $597$ A $647$ 4 $598$ B $648$ 4 $599$ A $649$ 3 $600$ A $650$ 15			583	С	633	
585       B       635       3         586       D       636       8         587       D       637       16         588       638       2         589       639       4         590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			584	С	634	5
586       D       636       8         587       D       637       16         588       638       2         589       639       4         590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			585	В	635	3
587       D       637       16         588       638       2         589       639       4         590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			586	D	636	8
588       638       2         589       639       4         590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			587	D	637	16
589       639       4         590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			588		638	2
590       640       17         591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			589		639	4
591       C       641       1         592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			590		640	17
592       A       642       90         593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			591	С	641	1
593       B       643       3         594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			592	A	642	90
594       B       644       40         595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			593	В	643	3
595       A       645       2         596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			594	В	644	40
596       B       646       6         597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			595	А	645	2
597       A       647       4         598       B       648       4         599       A       649       3         600       A       650       15			596	В	646	6
598         B         648         4           599         A         649         3           600         A         650         15			597	A	647	4
599         A         649         3           600         A         650         15			598	В	648	4
600 A 650 15			599	A	649	3
			600	А	650	15