08-08-15_Sr.IPLCO_JEE-Main_RPTM-2_ Syllabus

Mathematics:

PARABOLA AND CIRCLES

Physics:

N L M and Friction(Circular motion excluded)

Chemistry:

ALKANES, ALKENES and ALKYNES

Preparation, properties and reactions of Alkanes, Alkenes, Alkynes and Dienes

MATHEMATICS

61. Let P be the point of intersection of the circle $x^2+y^2=5$ and the parabola $y^2=4x$. which lies in first quadrant. The tangent to the circle at P meets the parabola at point S and the tangent to the parabola at P meets the circle at R, where S,R are distinct from P, then the equation of the line RS is

1) $x+2y=5$ 2) $11x+27y=5$ 3) $3x+y+5=0$ 4) $4x-11y=35$

62. Let PQ be the common chord of the curves $x^2=4y$, $y^2=4x$ .Let from any point on PQ tangents are drawn to the circle $(x-2)^2+y^2=1$, then the chord of contact ,of these pair of tangents, will always passes through a fixed point, whose coordinates are given by

1) $\left(\frac{3}{2},\frac{1}{4}\right)$ 2) $\left(-\frac{3}{2},\frac{1}{4}\right)$ 3) $\left(-\frac{3}{2},\frac{1}{2}\right)$ 4) $\left(\frac{3}{2},\frac{1}{2}\right)$

63. Locus of point of intersection of tangents at the ends of any chord of the parabola $y^2=4ax$ which is at a distance $d\neq 0$, from it's vertex , is given by

1) $d^2\left(y^2+a^2\right)=x^2a^2$ 2) $d^2\left(4y^2+a^2\right)=x^2$

3) $d^2\left(y^2+4a^2\right)=4x^2a^2$ 4) $d^2\left(y^2+a^2\right)=4x^2a^2$

64. Length of common chord of the circles $(x-a)^2+(y-b)^2=(a-b)^2$ and $(x-b)^2+(y-a)^2=(a-b)^2, a\neq b$ is given by

1) $\sqrt{2}|a-b|$ 2) $\sqrt{3}|a-b|$ 3) $\frac{\sqrt{2}|a-b|}{2}$ 4) $\frac{|a-b|}{2}$

65. Consider a trapezium ABCD, where the lines AD,BC are both perpendicular to x axis with all of it's vertices lying on the parabola $y^2=4x$ .Further both its diagonals are of length l and are passing through $(1,0)$. If the area of this trapezium ABCD is given by $\lambda l\sqrt{l-4}$,The value of λ is

1) 3 2) $\frac{1}{2}$ 3) 4 4)2

66. Statement 1: Area of the quadrilateral formed by the direct common tangents ,and their points of contact , of the circles $(x-4)^2+y^2=4, x^2+y^2=1$ is $\frac{45\sqrt{15}}{4}$

Statement 2: Equations of the direct common tangents of the circles $(x-4)^2+y^2=4, x^2+y^2=1$ are given by $y=\pm\frac{1}{\sqrt{15}}(x+4)$

1)Statement 1 is true; statement 2 is true; statement 2 is a correct explanation for statement 1.
2)Statement 1 is true; statement 2 is true; statement 2 is NOT a correct explanation for statement 1.
3) Statement 1 is true; statement 2 is false
4) Statement 1 is false ; statement 2 is true

67. Equation of directrix of the parabola $-4y+y^2=x-2$ is given by

1) $4x+9=0$ 2) $4x-9=0$ 3) $4x-1=0$ 4) $4x+1=0$

68. If the circles $x^2+y^2+2hx+y-1=0, x^2+y^2-hx-ky-1=0$ has to intersect orthogonally where h *and* k ,are real variables, Then the locus of the point (h,k) will be

1) a circle of radius $\frac{1}{2}$ 2) a parabola with length of latusrectum $\frac{1}{2}$
3) a circle of radius 1 4) a parabola with length of latusrectum 1

69. The range of values of $k\in\mathbb{R}$ so that the circles $(x-k)^2+y^2=\frac{k^2}{2}$, $x^2+(y-k)^2=k^2+k$ will have exactly 4 common tangents is given by

1) $k\in(-2,0)$ 2) $k\in(-1,0)$ 3) $k\in(-2,-1)$ 4) $k\in(-\infty,-1)\cup(2,\infty)$

70. Let V,S be the vertex and focus of the parabola $(x-1)^2=-4y$ .Then the point P lying on the axis of the parabola such that $SP=2PV$, is

1) $\left(1,\frac{1}{3}\right)$ 2) $\left(1,-\frac{1}{3}\right)$ 3) $\left(1,\frac{4}{3}\right)$ 4) $\left(1,-\frac{4}{3}\right)$

71. From the point P(2,1), a line of slope $m \in \mathbb{R}$ is drawn so as to cut the circle $x^2+y^2=1$ in points A and B. If we vary the slope m ,the least possible value of the Harmonic Mean of distances PA and PB will be

1) $\frac{2}{\sqrt{5}}$ 2) $\frac{4}{\sqrt{5}}$ 3) $\frac{6}{\sqrt{5}}$ 4) $\frac{1}{\sqrt{5}}$

72. Statement 1: Let $x\cos\theta - y\sin\theta + 1 = 0, 2x\cos\theta - 2y\sin\theta + 3 = 0$ be the equations of pair of tangents to a given circle ,then radius of the circle is $\frac{1}{4}$.

Statement 2: The difference between perpendicular distances of origin from the pair of tangents $x\cos\theta - y\sin\theta + 1 = 0, 2x\cos\theta - 2y\sin\theta + 3 = 0$ is equal to it's radius.

1)Statement 1 is true; statement 2 is true; statement 2 is a correct explanation for statement 1.

2)Statement 1 is true; statement 2 is true; statement 2 is NOT a correct explanation for statement 1.

3) Statement 1 is true; statement 2 is false

4) Statement 1 is false ; statement 2 is true

73. The equation of the circle, described on the common chord of the circles $x^2+y^2-1=0, x^2+y^2-4x=0$ as its diameter, is

1) $4\left(x^2+y^2\right)-12x-1=0$ 2) $16\left(x^2+y^2\right)-4x-15=0$

3) $8\left(x^2+y^2\right)+4x-9=0$ 4) $8\left(x^2+y^2\right)-4x-7=0$

74. Let P be any point the circle $x^2+y^2-2x-2y=0$. the equation to the locus of orthocenter of the triangle formed by point P with given points (0,2) and (2,0 is given by

1) $(3x-3)^2+(3y-3)^2=2$ 2) $(x-1)^2+(y-1)^2=2$

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

75. Let from the point (p,q) on the circle $x^2+y^2=px+qy, pq\neq 0$, two distinct chords are drawn to the circle in such a way that both the chords got bisected by y-axis.
then which must be true?

1) $q^2>8p^2$ 2) $p^2>8q^2$ 3) $q^2<8p^2$ 4) $p^2=8q^2$

76. The equation of circumcircle of the triangle formed by the ends of latusrectum of the parabola $y^2=4ax$ and the point of intersection of tangents drawn to the parabola at these points is given by

1) $(x+a)^2+(y+a)^2=13a^2$ 2) $(x-a)^2+(y-a)^2=9a^2$

3) $(x-a)^2+y^2=4a^2$ 4) $x^2+y^2=5a^2$

77. If the line $y=mx+c, c\neq 0$ cuts the circle $x^2+y^2=r^2$ at two distinct points A and B such that the chord AB subtends right angle at the point (0,0), then which must always be true?

1) $c^2=r^2(1+m^2)$ 2) $c^2=2r^2(1+m^2)$ 3) $2c^2=r^2(1+m^2)$ 4) $c^2=r^2(2+m^2)$

78. All the chords of the parabola $y^2=4ax$, which will subtend a right angle at its vertex must pass through the fixed point given by

1) $(a,0)$ 2) $(4a,0)$ 3) $(3a,0)$ 4) $(2a,0)$

79. The angle of intersection of the circles given by $x^2+y^2=2x+4y+1, x^2+y^2=4x+2y-1$ is

1) $\pi-\cos^{-1}\left(\sqrt{\frac{2}{3}}\right)$ 2) $\frac{\pi}{2}$ 3) $\pi-\cos^{-1}\left(\sqrt{\frac{1}{3}}\right)$ 4) $\frac{\pi}{3}$

80. If the line $2x+y=k$ has to be tangent to the parabola $x^2=4y$ then value of k must be

1) 12 2) 8 3)1 4)-4

81. If a focal chord of slope m of the parabola $y^2 = 4x$ touches the circle $x^2 + y^2 = r^2, r > 0$ then which must be true?

1) $m^2 = \frac{r^2}{1-r^2}$ 2) $m^2 = \frac{r^2}{r^2-1}$ 3) $m^2 = \frac{r}{1-r^2}$ 4) $m^2 = \frac{r^2}{1+r^2}$

82. Area of the triangle formed by pair of tangents, drawn from the point $(-a, 0)$ to the parabola $y^2 = 4ax$ and their chord of contact is

1) $4a^2$ 2) $3a^2$ 3) $2a^2$ 4) a^2

83. The number of common tangents of the circle $x^2 + y^2 = r^2$ and the parabola $y^2 = 4(x-r), r > 0$ is

1) 4 2) 1 3) 2 4) 3

84. The locus of midpoint of vertex and any moving point on the parabola $y^2 = 4ax$ is also a parabola whose length of latus rectum is

1) $4a$ 2) $2a$ 3) a 4) $3a$

85. If $x = 2t+1, y = 1-t^2$ where $t \in \mathbb{R}$ is a variable, locus of the point $P(x, y)$ is a parabola whose focus is given by

1) (0,0) 2) (0,-1) 3) (-1,0) 4) (1,0)

86. Consider the curve $y^2 = 4a(x+a),$ where $a \in \mathbb{R}$ is a variable. As a varies , one of the following will remain constant related to the given parabola, which one is it?

1)Length of LatusRectum 2)Equation of tangent at its vertex

3) Focus 4)distance between focus and directrix

87. Let $2x - y - 3 = 0, x + 3y + 2 = 0$ are equations of two diameters of a circle, with P(2,0) lying on this circle. Then the other end of diameter through P is

1) (0,-2) 2) (-2,0) 3)(0,2) 4) (2,0)

88. Let from any point lying on the line $x=1$ two tangents are drawn to the parabola $y^2=4(x-2)$ .then angle between the tangents

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{2}$ 4) $\frac{\pi}{4}$

89. Statement 1: Slope of the common tangent of the parabolas $x^2=4y, y^2=32x$ is -2

Statement 2: equation of common tangent can be taken as $y=mx+\frac{8}{m}$

where satisfies the equation $m^3+8=0$

1)Statement 1 is true; statement 2 is true; statement 2 is a correct explanation for statement 1.

2)Statement 1 is true; statement 2 is true; statement 2 is NOT a correct explanation for statement 1.

3) Statement 1 is true; statement 2 is false

4) Statement 1 is false ; statement 2 is true

90. Equation of the parabola whose focus is center of the circle $x^2+y^2=4x+6y$ and whose directrix is the line $x-y=0$ is

1) $x^2+y^2+2xy-8x-12y+26=0$ 2) $x^2+y^2-2xy-8x-12y-26=0$

3) $x^2+y^2+2xy+8x+12y+26=0$ 4) $x^2+y^2-2xy-8x-12y+26=0$