MATHS

JEE (MAIN AND ADVANCED) MATHEMATICS

REVISION EXERCISE

Circles

1. A line meets coordinate axes in A and B. A circle is circumscribed about the triangle OAB . If m and n are distances of tangent to circle at origin from the point A and B respectively then diameter of the circle is

A. $m+n$

B. $m-n$

C. mn

D. m/n

Answer: A

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2. If the distances from the origin to the centres of three circles $x^2 + y^2 - 2kix = c^2, (i = 1, 2, 3)$ are in G.P, then the length of the tangents drawn to them from any point on the circle $x^2 + y^2 = c^2$ are in

A. A.P

B. G.P

C. H.P

D. A.G.P

Answer: B

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3. Let x(x-a) + y (y-1) =0 be a circle. If two chords from (a,1) bisected by X-axis are drawn to the circle then the condition is

A. $a^2 > 8$

B. $a^2 < 8$

C. $a^2 > 4$

D. $a^2 < 4$

Answer: A

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4. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. Suppose that the tangent at the points B(1,7) and D(4,-2) on the circle meet at the point C. The area of the quadrilateral ABCD is

A. 75 sq units

B. 145 sq.units

C. 150 sq. units

D. 50 sq. units

Answer: A

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5. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch (or) Intersects the coordinate axes and the point (1,4) lies inside the circle then limits of k are.

A. $25 < K < 29$

B. $25 < K < 27$

C. $28 < K < 29$

D. $0 < K < 29$

Answer: A

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6. A circle is inscribed ina n equilateral triangle and a square is inscribed in the circle. The ratio of the area of the triangle to the area of the square is

A. $\sqrt{3}:\sqrt{2}$

B. $\sqrt{3}:1$

C. $3\sqrt{3}:2$

D. $3:\sqrt{2}$

Answer: C

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7. Two circles with radii r_1 and $r_2, r_1 > r_2 \geq 2,$ touch other externally. If $'\alpha'$ be the angle between direct common tangents ,then

A. $\alpha = \sin^{-1}\left(\frac{r_1 + r_2}{r_1 - r_2}\right)$

B. $\alpha = 2\sin^{-1}\left(\frac{r_1 - r_2}{r_1 + r_2}\right)$

C. $\alpha = \sin^{-1}\left(\frac{r_1 - r_2}{r_1 + r_2}\right)$

D. $\alpha = \sin^{-1}\left(\frac{r_1}{r_1}\right)$

Answer: B

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8. Let A and B be any two point on each of the circles $x^2 + y^2 - 8x - 8y + 28 = 0$ and $x^2 + y^2 - 2x - 3 = 0$ respectively . If d is the distance between A and B then the set of all possible values of d is

A. $1 \leq d \leq 9$

B. $1 \leq d \leq 8$

C. $0 \leq d \leq 8$

D. $0 \leq d \leq 9$

Answer: A

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9. The equation of the circle which passes through the origin and cuts off chords of length 2 from the lines x=y and x=-y is

A. $x^2 + y^2 \pm ax \pm ay = 0$

B. $x^2 + y^2 \pm \sqrt{2}ay = 0$

C. $x^2 + y^2 \pm \sqrt{2}ax = 0$

D. both (2) and (3)

Answer: D

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10. The centres of a set circles ,each of radius 3, lie on the circle $x^2 + y^2 = 25$. The locus of any point in the set is.

A. $4 \leq x^2 + y^2 \leq 64$

B. $\left|x^2 + y^2\right| \leq 25$

C. $x^2 + y^2 \geq 25$

D. $3 \leq x^2 + y^2 \leq 9$

Answer: A

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11. Equation of circle touching the lines. $|x - 2| + |y - 3| = 4$ is

A. $(x - 2)^2 + (y - 3)^2 = 12$

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

C. $(x - 2)^2 + (y - 3)^2 = 8$

D. $(x - 2)^2 + (y - 3)^2 = 16$

Answer: C

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12. If $4t^2 - 5m(2) + 6l + 1 = 0$, then the line lx+my+1=0 touches the circle

A. $(0, 3)$

B. $(-3, 0)$

C. $(3, 0)$

D. $(0, -3)$

Answer: C

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13. Four circles each with radius 2 touch both axes then the radius of the largest circle touching all the four circles is

A. $\sqrt{2} + 1$

B. $2(\sqrt{2} + 1)$

C. $\sqrt{2}-1$

D. $2(3+\sqrt{2})$

Answer: B

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14. A circle touches x-axis at (2,0) and also the line y=x in first quadrant then its radius is

A. $\sqrt{2}-1$

B. $2-\sqrt{2}$

C. $2(\sqrt{2}-1)$

D. $\sqrt{2}+1$

Answer: C

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15. C_1 is a circle of radius 1 and touching both the axis . C_2 is another circle which touch both the axis and also circle C_1 whose radius > 1 then radius of C_2 is

A. $(3 - 2\sqrt{2})$

B. $2\sqrt{2}$

C. $(3 + 2\sqrt{2})$

D. $(4 + 2\sqrt{2})$

Answer: C

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16. If the tangent at P on the circle $x^2 + y^2 = a^2$ cuts two parallel tangents of the circle at A and B then PA, PB =

A. A.P

B. a^2

C. $2a$

D. $2a^2$

Answer: B

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17. Let $s = x^2 + y^2 + 2gx + 2fy + c = 0$ be a circle with centre O and P = Perpendicular distances from Q to the polar of P with respect to the s =0 q= Perpendicular distance from P to the polar of Q with respect to the circle s= 0

1. $\frac{OQ}{OP} = \frac{p}{q}$ for any points P,Q

(II) $\frac{OQ}{OP} = \frac{p}{q}$ for any points P,Q other than conjugate points , which of them following is correct?

A. I true ,II true

B. I true , II False

C. I false , II true

D. I false , II false

Answer: B

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18. The radius of the circle which touches `x^(2) +y^(2) -6x + 6y +17=0

A. $\sqrt{2}-1$

B. $4\sqrt{2}-1$

C. $3\sqrt{2}-1$

D. $3\sqrt{2}+1$

Answer: C

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19. If the lines 2x+3y+1=0 and 3x-y-4=0 lie along diameters of a circle of circumference 10π, then the equation of the circle is

A. $x^2 + y^2 - 2x + 2y - 23 = 0$

B. $x^2 + y^2 + 2x - 2y - 23 = 0$

C. $x^2 + y^2 + 2x + 2y - 23 = 0$

D. $x^2 + y^2 - 2x - 2y - 23 = 0$

Answer: A

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20. If the lines 3x-4y-7=0 and 2x-3y-5=0 are two diameters of a circle of area 49π square units, the equation of the circle is

A. $x^2 + y^2 + 2x - 2y - 47 = 0$

B. $x^2 + y^2 + 2x - 2y - 62 = 0$

C. $x^2 + y^2 - 2x + 2y - 62 = 0$

D. $x^2 + y^2 - 2x + 2y - 47 = 0$

Answer: D

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21. A circle touches the x-axis and also touches the circle with centre at (0,3) and radius 2. The locus of the centre of the circle is

A. an ellipse

B. a circle

C. a hyperbola

D. a parabola

Answer: D

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22. The greatest distance of the point $P(10, 7)$ from the circle $x^2 + y^2 - 4x - 2y - 20 = 0$ is

A. 10

B. 15

C. 5

D. 12

Answer: B

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23. A variable circle passes through the fixed point A(p, q) and touches axis. The locus of the other end of the diameter through A is

A. $(x - p)^2 = 4qy$

B. $(x - q)^2 = 4py$

C. $(y - p)^2 = 4qx$

D. $(y-q)^2 = 4px$

Answer: A

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24. Let "c" be the circle with centre at (1,1) and radius =1. If 'T' is the circle centred at (0,y) passing thorugh origin and touching the circle 'C' externally , then the radius of 'T' is equal to:

A. $\frac{\sqrt{3}}{\sqrt{2}}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer: D

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25. If each of the lines $5x + 8y = 13$ and $4x - y = 3$ contains a diameter of the circle $x^2 + y^2 - 2(a^2 - 7a + 11)x - 2(a^2 - 6a + 6)y + b^3 + 1 = 0$ then

A. $a = 5$ and $b \in (-1, 1)$

B. $a = 1$ and $b \in (-1, 1)$

C. $a = 2$ and $b \in (-\infty, 1)$

D. $a = 5$ and $b \in (-\infty, 1)$

Answer: D

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26. If two vertices of an equilateral triangle are A (-a,0) and B(a,0) , $a > 0$ and the third vertex C lies above x-axis , then the equation of the circumcircle of ΔABC is

A. $3x^2 + 3y^2 - 2\sqrt{3}ay = 3a^2$

B. $3x^2 + 3y^2 - 2ay = 3a^2$

C. $x^2 + y^2 - 2ay = a^2$

D. $x^2 + y^2 - \sqrt{3}ay = a^2$

Answer: A

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27. If the circle $x^2 + y^2 - 6x - 8y + (25 - a^2) = 0$ touches the axis of x, then a equals.

A. 0

B. ± 4

C. ± 2

D. ± 3

Answer: B

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28. Statement 1: The only circle having radius $\sqrt{10}$ and a diameter along line $2x + y = 5is x^2 + y^2 - 6x + 2y = 0$

Statement 2: $2x + y = 5$ is a normal to the circle $x^2 + y^2 - 6x + 2y = 0$

A. Statement 1 is false ,statement 2 is true

B. Statement 1 is true ,statement 2 is true and statement 2 is a correct explanation for statement 1

C. Statement 1 is true, statement 2 is false

D. Statement 1 is true, statement 2 is true but statement 2 is not a correct explanation for statement 1

Answer: B

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29. If a point (1,4) lies inside the circle $x^2 + y^2 - 6x - 10y + p = 0$ and the circle does not touch or intersect the coordinate axes , then the set of all possible values of p is the interval.

A. $(0, 25)$

B. $(25, 39)$

C. $(9, 25)$

D. $(25, 29)$

Answer: C

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30. The set of all real values of λ for which exactly two common tangents can be drawn to the circle $x^2 + y^2 - 4x - 4y + 6 = 0$ and $x^2 + y^2 - 10x - 10y + \lambda = 0$ is the interval

A. $(12, 32)$

B. $(18, 42)$

C. $(12, 24)$

D. $(18, 48)$

Answer: B

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31. For the two circles $x^2 + y^2 = 16$ and $x^2 + y^2 - 2y = 0$ there is/are

A. one pair of common tangents

B. two pairs of common tangents

C. three common tangents

D. no common tangents

Answer: D

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32. The equation of the circle described on the chord $3x + y + 5 = 0$ of the circle $x^2 + y^2 = 16$ as diameter is

A. $x^2 + y^2 + 3x + y - 11 = 0$

B. $x^2 + y^2 + 3x + y + 1 = 0$

C. $x^2 + y^2 + 3x + y - 2 = 0$

D. $x^2 + y^2 + 3x + y - 22 = 0$

Answer: A

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33. The line $x \sin \alpha - y \cos \alpha = a$ touches the circle $x^2 + y^2 = a^2$,then

A. $\alpha \in [0, \pi]$

B. $\alpha \in [-\pi, \pi]$

C. α can have any value

D. $\alpha \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Answer: C

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34. If a circle of area 16π has two of its diamters along the line $2x - 3y + 5 = 0$ and $x + 3y - 11 = 0$ then the equation of the circle is

A. $x^2 + y^2 - 4x + 6y - 13 = 0$

B. $x^2 + y^2 - 4x - 6y - 3 = 0$

C. $x^2 + y^2 - 4x - 6y - 13 = 0$

D. $x^2 + y^2 - 4x + 6y - 3 = 0$

Answer: B

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35. The number of common tangents to the circle $x^2 + y^2 - 4x - 6y - 12 = 0$ and $x^2y^2 + 6x + 18y + 26 = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

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System Of Circles

1. The condition that the circles which passes through the points $(0, a), (0, -a)$ and touch the line $y = mx + c$ will cut orthogonally is

A. $c^2 = a^2(1 + m^2)$

B. $c^2 = a^2(2 + m^2)$

C. $c^2 = a^2(3 + m^2)$

D. $c^2 = a^2(4 + m^2)$

Answer: B

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2. If the equations of two circles whose radii are a and a' are S=0 and S'=0 , then show that the circles $\frac{S}{a}+\frac{S'}{a'}=0$ and $\frac{S}{a}-\frac{S'}{a'}=0$ intersect orthogonally.

A. $\frac{\pi}{3}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

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3. The pints of intersection of two equal circles which out orthogonally are (2,3) and (5,4) Then the radius of each circle is

A. 1

B. $5\sqrt{2}$

C. $\sqrt{5}$

D. $\sqrt{2}$

Answer: C

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4. Tangents are drawn to circle $x^2 + y^2 = 12$ at its points of intersection with the circle $x^2 + y^2 - 5x + 3y - 2 = 0$ then coordinates of their point of intersection is

A. $\left(6, \frac{18}{5}\right)$

B. $\left(6, \frac{-18}{5}\right)$

C. $\left(-6, \frac{18}{5}\right)$

D. $\left(-6, \frac{-18}{5}\right)$

Answer: B

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5. The polars of a point P w.r.t. two given circles meet in Q .The radical axis of the circles divide PQ in the ratio

A. $1:1$

B. $1:2$

C. $2:1$

D. $2:3$

Answer: A

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6. The radical axis of two circles whose centres are (3,4), (-1,2) and each passing through the centre of the other is

A. $2x + y + 5 = 0$

B. $x - 2y + 5 = 0$

C. $2x + y - 1 = 0$

D. $2x + y - 5 = 0$

Answer: D

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7. If $S \equiv x^2 + y^2 - 2x = 0, S' \equiv x^2 + y^2 + 3x = 0$ and if $\bar{AB}$ is a direct common tangent to the two circles (A, B are the point of contcact) then $\bar{AB}$ subtends at origin an angle.

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: D

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8. The maximum number of lines formed by the radical centres of 6 given circles is

A. 42

B. 190

C. 72

D. 120

Answer: B

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9. The locus of the centres of the circles passing thorugh the points of intersection of the circles $x^2 + y^2 = 1$ and $x^2 + y^2 - 2x + y = 0$ is

A. $2x - y = 0$

B. $x - 2y = 0$

C. $x + 2y = 0$

D. $2x + y = 0$

Answer: C

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10. For the circles $x^2 + y^2 + 2\lambda x + c = 0, x^2 + y^2 + 2my - c = 0$ the number of common tangents when $c \neq 0$ is

A. one

B. two

C. four

D. zero

Answer: B

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11. The circles $x^2 + y^2 + 2ax + c = 0$ and $x^2 + y^2 + 2bx + c = 0$ have no common tangent if

A. $ab > 0, c < 0$

B. $ab < 0, c > 0$

C. $ab > 0, c > 0$

D. $ab < 0, c < 0$

Answer: C

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12. The circles $x^2 + y^2 + 2ax + c = 0$ and $x^2 + y^2 + 2bx + c = 0$ have no common tangent if

A. $ab > 0, c < 0$

B. $ab < 0, c > 0$

C. $ab > 0, c > 0$

D. $ab < 0, c = 0$

Answer: B

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13. The radical axis of $x^2 + y^2 - 2ax = 0$ and $x^2 + y^2 - 2by = 0$ is common tangent to the circles if

A. $a > b$

B. $a < b$

C. $a = b$

D. $a = 1, b = 2$

Answer: C

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14. r_1, r_2 are the radii of two non intersecting circles having A , B as centres. If 'P' is the mid- point of AB ,then the perpendicular distance of P from their radical axis is

A. $\left|\frac{r_1^2 - r_2^2}{2AB}\right|$

B. $\left|\frac{r_1^2 + r_2^2}{2AB}\right|$

C. $\left|\frac{2AB}{r_1^2 + r_2^2}\right|$

D. $\left|\frac{2AB}{r_1^2 - r_2^2}\right|$

Answer: A

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15. In ΔABC, if $A = (1, 2), B = (3, 4)$ and $AC = 3, BC = 4$, then the equation of altitude through the vertex 'C' is

A. $4x + 4y + 13 = 0$

B. $4x + 4y - 13 = 0$

C. $x + y + 1 = 0$

D. $x + y - 1 = 0$

Answer: B

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16. A = (0,0) , B=(4,0) ,C= (0,6) are the three centres of three circles of equal radii which do not touch externally pairwise. Then the radical centre of the circles is

A. A) $(2, 3)$

B. B) $\left(\frac{4}{3}, 2\right)$

C. C) $(0, 0)$

D. D) $(4, 0)$

Answer: A

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17. Circles with radii 3,4,5 are touching each other externally , If P is the point of intersection of tangents to these circles at their point of contact ,the distances of P from the points of contact is

A. $\sqrt{2}$

B. $\sqrt{5}$

C. 4

D. $\sqrt{7}$

Answer: B

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18. Three circles touch one another externally , The tangents at their points of contact meet at a point whose distance from the point of contact is 4. The ratio of product of their radii to the sum of radii of the circles is

A. $16:1$

B. $8:7$

C. $3:4$

D. $1:6$

Answer: A

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19. If a circle passes through the point (a,b) and cuts the circles $x^2+y^2=4$ orthogonally then the locus of its centre is

A. $2ax+2by+a^2+b^2+4=0$

B. $2ax-2by-(a^2+b^2+4)=0$

C. $2ax-2by+(a^2+b^2+4)=0$

D. $2ax+2by-(a^2+b^2+4)=0$

Answer: D

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20. The value of k for which the circle $x^2 + y^2 - 4x + 6y + 3 = 0$ will bisect the circumferece of the circle $x^2 + y^2 + 6x - 4y + k = 0$ is

A. 53

B. -53

C. 47

D. -47

Answer: A

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21. If the point $(2, k)$ lies outside the circles $x^2 + y^2 = 13$ and $x^2 + y^2 + x - 2y - 14 = 0$ then

A. $K \in (-\infty, -2) \cup [3, \infty)$

B. $K \in [-3, -2] \cup [3, 4]$

C. $K \in [-3, -4]$

D. $K \in (-\infty, -3) \cup (4, \infty)$

Answer: D

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22. The midpoint of the chord intercepted by the circle $x^2 + y^2 = 16$ on the line through the point (1,-2) and (0,-1) is

A. $\left(-\frac{1}{2}, -\frac{1}{2}\right)$

B. $\left(\frac{1}{2}, \frac{3}{2}\right)$

C. $\left(-\frac{1}{4}, -\frac{1}{4}\right)$

D. $\left(\frac{3}{4}, \frac{1}{4}\right)$

Answer: A

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Parabola

1. The curve describe parametrically by $x = t^2 + t + 1, y = t^2 - t + 1$ represents

A. hyperbola

B. eliipse

C. parabola

D. rectangular hyperbola

Answer: C

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2. A telegraphic wire suspended between two poles of height 15 mts is in the shape of a parabola. The distance between the poles is 20 mts and maximum sag of the cable wire is 4mt , then the height of the cable at a distance of 5 mt from one end is

A. 12

B. 11

C. 10

D. 13

Answer: A

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3. Angle subtended by double ordinate of length $32\sqrt{3}$ of the parabola $x^2 - 6x + 16y + 25 = 0$ at the vertex

A. A) $\frac{\pi}{2}$

B. B) $\frac{\pi}{2}$

C. C) $\frac{\pi}{6}$

D. D) $\frac{\pi}{3}$

Answer: D

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4. In the parabola $y^2 - 2y + 8x - 23 = 0$ the length of double ordinate at a distance of 4 units from its vertex is

A. 2

B. 8

C. 12

D. $8\sqrt{2}$

Answer: D

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5. The length of the chord of the parabola $x^2 = 4ay$ passing through the vertex and having slope $\tan\alpha$is

A. $4a \cos ec\alpha \cot \alpha$

B. $4a \tan \alpha \sec \alpha$

C. $4a \cos \alpha, \cot \alpha$

D. $4a \sin \alpha, \tan \alpha$

Answer: B

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6. Length of chord of parabola $y^2 = 4ax$ whose equation is $y - \sqrt{2}x + 4\sqrt{2}a = 0$

A. $2\sqrt{11a}$

B. $4\sqrt{2}a$

C. $8\sqrt{2}a$

D. $6\sqrt{3}a$

Answer: D

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7. The tangent to $y^2 = ax$ makes an angle 45° with x-axis . Then its point of contact is

A. $\left(\frac{a}{2}, \frac{1}{4}\right)$

B. $\left(\frac{-a}{4}, \frac{a}{4}\right)$

C. $\left(\frac{a}{4}, \frac{a}{2}\right)$

D. $\left(\frac{-a}{4}, \frac{a}{2}\right)$

Answer: C

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8. Point of contact of the line $kx + y - 4 = 0, w.r.t.$ the parabola $y = x - x^2$ is

A. $(-2, 2)$

B. $(2, -2)$

C. $(-2, 6)$

D. $(2, -6)$

Answer: B

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9. P and Q are two points on the parabola $(y - 2)^2 = (4 - 3)$. The normals and tangents at P and Q form a square then point of intersection of tangents at P, Q is

A. $(-1, 0)$

B. $(-4, 2)$

C. $(2, 2)$

D. $(3, 2)$

Answer: C

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10. Two straight lines are perpendicular to each other. One of them touches the parabola $y^2 = 4a(x + a)$, and the other touches $y^2 = 4b(x + b)$. Then locus of point of intersection of two lines is

A. $x + a = 0$

B. $x + b = 0$

C. $x + a + b = 0$

D. $x - a - b = 0$

Answer: C

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11. If two tangents drawn from a point P to the parabola $y^2 = 4x$ are at right angles then the locus of P is

A. $2x + 1 = 0$

B. $x = -1$

C. $2x - 1 = 0$

D. $x = 1$

Answer: B

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12. Assertion (A) : The least length of the focal chord of $y^2 = 4ax$ is 4a

Reason (R) : Length of the focal chord of $y^2 = 4ax$ makes an angle θ with axis is $4a \cos ec^2\theta$

A. Both A and R are true and R $\Rightarrow A$

B. Both A and R are true and $R \not\Rightarrow A$

C. A is true but R is false

D. A is false but R is true.

Answer: A

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13. Assertion (A) : Orthocentre of the triangle formed by any three tangents to the parabola lies on the directrix of the parabola

Reason ® : The orthocentre of the triangle formed by the tangents at t_1, t_2, t_3 to the parabola $y^2 = 4axis(-a(t_1 + t_2 + t_3 + t_1t_2t_3))$

A. Both A and R are true and R $\Rightarrow A$

B. Both A and R are true and $R \not\Rightarrow A$

C. A is true but R is false

D. A is false but R is true.

Answer: A

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14. Show that length of perpendecular from focus 'S' of the parabola $y^2 = 4ax$ on the Tangent at P is $\sqrt{OS. SP}$

A. $\sqrt{OS. SP}$

B. $OS. SP$

C. $OS + OP$

D. none

Answer: A

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15. If A,B,C are 3 points on a parabola , Δ_1, Δ_2 are the areas of triangles is formed by the points A, B,C and the tangents at A, B, C . If Δ_1, Δ_2 are the roots of $px^2 + qx + r = 0$ then condition is

A. $9q^2 = 2pr$

B. $9pr = 2q^2$

C. $9p^2 = 2qr$

D. $2p^2 = 9qr$

Answer: B

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16. Prove that the orthocentre of the triangle formed by any three tangents to a parabola lies on the directrix of the parabola

A. Axis

B. Directrix

C. Tangent at the vertex

D. none

Answer: B

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17. The tangent at 't' on the parabola $y^2 = 4ax$ is parallel to a normal chord then distance between them is

A. $\frac{a\sqrt{1+t^2}}{t^2}$

B. $\frac{a(1+t^2)^{3/2}}{t^2}$

C. $\frac{a^2(1+t^2)^{3/2}}{t}$

D. $\frac{a(1+t^2)^{3/2}}{t}$

Answer: B

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18. The no. of normals drawn to $(y-1)^2 = 8(x+3)$ through (4,1)

A. 3

B. 2

C. 1

D. 0

Answer: A

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19. The normal at 'P' cuts the axis of the parabola $y^2 = 4ax$ in G and S is the focus of the parabola. If ΔSPG is equilateral then each side is of length.

A. a

B. 2a

C. 3a

D. 4a

Answer: D

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20. If two of the three feet of normals drawn from a point to the parabola $y^2 = 4x$ be (1,2) , (1,-2) then third foot is

A. $(2, 2\sqrt{2})$

B. $(2, -2\sqrt{2})$

C. $(0, 0)$

D. $(1, 1)$

Answer: C

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21. The equation of a tangent to the parabola $y^2 = 8x$ is $y = x + 2$. The point on this line from which the other tangent to the parabola is perpendicular to the given tangent is

A. $(-1, 1)$

B. $(0, 2)$

C. $(2, 4)$

D. $(-2, 0)$

Answer: D

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22. The locus of middle points of normal chords of the parabola $y^2 = 4ax$ is

A. $\frac{y^2}{2a} + \frac{4a^3}{y^2} = x - 2a$

B. $\frac{y^2}{2a} - \frac{4a^3}{y^2} = x - 2a$

C. $\frac{y^2}{2a} + \frac{4a^3}{y^2} = x + 2a$

D. $\frac{y^2}{2a} - \frac{4a^3}{y^2} = x - 2a$

Answer: A

Watch Video Solution

23. If the normals at P and Q meet again on $y^2 = 4ax$ at R then centroid of ΔPQR lies on

A. Axis

B. latus rectum

C. directrix

D. parabola

Answer: A

View Text Solution

24. If the normal to $y^2 = 4ax$ at t_1 cuts the parabola again at t_2 then

A. $t_2^2 \leq 8$

B. $t_2^2 \geq 8$

C. $-8 \leq t_2 \leq 8$

D. $t_2^2 < 8$

Answer: B

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25. Point of concurrence of the normals drawn at (2,8) , (128,64) , (162, -72) to the parabola $y^2 = 32x$ is

A. A) $(2, 8)$

B. B) $(128, 64)$

C. C) $(162, -72)$

D. D) $(162, 72)$

Answer: C

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26. If $(x_1, y_1), (x_2, y_2), (x_3 y_3)$ are feet of the three normals drawn from a point to the parabola

$$y^2 = 4ax \text{then} \sum \frac{x_1 - x_2}{y_3}$$

A. $4a$

B. $2a$

C. 1

D. 0

Answer: D

View Text Solution

27. If two normals drawn to the $y^2 = 8xat(2, 4)$ and (18, 12) intersect at $P(x_1, y_1)$ then foot of the 3rd normal through p is

A. $(32, 16)$

B. $(32, \ -16)$

C. $(-16, 32)$

D. $(2, 4)$

Answer: B

Watch Video Solution

28. If the normals at P and Q meet again on the parabola $y^2 = 4ax$ then the chord joining P and Q passes thorugh a fixed point

A. A) $(-a, 0)$

B. B) $(-2a, 0)$

C. C) $(-3a, 0)$

D. D) $(-4a, 0)$

Answer: B

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29. The shortest distance between the line y-x =1 and the curve $x = y^2$ is

A. $\frac{2\sqrt{3}}{8}$

B. $\frac{3\sqrt{2}}{5}$

C. $\frac{\sqrt{3}}{4}$

D. $\frac{3\sqrt{2}}{8}$

Answer: D

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30. If the parabola $y^2 = ax$ passes through (1, 2) then the equation of the directrix is

A. $x + 2y = 0$

B. $2x - y = 0$

C. $2x + y = 0$

D. $x - 2y = 0$

Answer: C

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31. A set of parallel chords of the parabola $y^2 = 4ax$ have their mid-points on

A. any straight line through the vertex

B. any straight line throught the focus

C. a straight line parallel to the axis

D. a straight line parallel to the latusrectum

Answer: C

Watch Video Solution

32. If the angular bisectors of the coordinates axes cut the parabola $y^2 = 4ax$ at the points O, A, B then the area of ΔOAB is (O is the origin)

A. $3a^2$

B. $16a^2$

C. $64a^2$

D. $8a^2$

Answer: B

Watch Video Solution

33. If the straight line y=mx+c is parallel to the axis of the parabola $y^2 = lx$ and intersects the parabola at $\left(\frac{c^2}{8}, c\right)$ then the length of the latus rectum is

A. 2

B. 3

C. 4

D. 8

Answer: D

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34. The set of point on the axis of the parabola $y^2 - 2y - 4x + 5 = 0$ from which all the three normals to the parabola are real is:

A. $\{(x, 1) : x \geq 3\}$

B. $\{(x, -1) : x \geq 1\}$

C. $\{(x, 3) : x \geq 1\}$

D. $\{(x, -3) : x \geq 3\}$

Answer: A

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35. Given :A circle $2x^2 + 2y^2 = 5$ and a parabola $y^2 = 4\sqrt{5}x$.

Statement -I : an equation of a common tangent to these curves is $y = x + \sqrt{5}$.

Statement -II - If the line, $y = mx + \frac{\sqrt{5}}{m}(m \neq 0)$ is their common tangent ,then m satisfies $m^4 - 3m^2 + 2 = 0$

A. Statement -1 is true , Statement -II is true Statement -II is a correct explanation for Statement -I

B. Statement -I is true, Statement -II is true , Statement -II is a not correct explanation for Statement-I

C. Statement -1 is true ,Statement -II is false

D. Statement -1 is false , Statement -II is true

Answer: B

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36. If $a \neq 0$ and the line 2bx+3cy+4d =0 passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ then

A. $d^2 + (2b + 3c)^2 = 0$

B. $d^2 + (3b - 2c)^2 = 0$

C. $d^2 + (2b - 3c)^2 = 0$

D. $d^2 + (3b + 2c)^2 = 0$

Answer: A

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37. The equation of the directrix of the parabola $y^2 + 4y + 4x + 2 = 0$ is

A. $x = -1$

B. $x = 1$

C. $x = -\frac{3}{2}$

D. $x = \frac{3}{2}$

Answer: D

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38. The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is

A. $xy = \frac{35}{16}$

B. $xy = \frac{64}{105}$

C. $xy = \frac{105}{64}$

D. $xy = \frac{3}{4}$

Answer: C

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39. The equation of the common tangent to $x^2 + y^2 = 2a^2 \text{and} y^2 = 8ax$ is

A. $y = \pm(x+a)$

B. $y = \pm(x+2a)$

C. $y = \pm(x-2a)$

D. $y = \pm(x-a)$

Answer: B

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40. The normal at a point $(bt_1^2, 2bt_1)$ on a parabola meets the parabola again in the point $(bt_2^2, 2bt_2)$ then

A. $t_2 = -t_1 + \frac{2}{t_1}$

B. $t_2 = t_1 + \frac{2}{t_1}$

C. $t_2 = t_1 + \frac{2}{t_1}$

D. $t_2 = -t_1 - \frac{2}{t_1}$

Answer: D

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41. The sloope of the line touching both the parabolas $y^2 = 4x$ and $x^2 = 32y$ is

A. $\frac{1}{2}$

B. $\frac{3}{2}$

C. $\frac{1}{8}$

D. $\frac{3}{2}$

Answer: A

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42. Statement 1: The slope of the tangent at any point P on a parabola , whose axis is the axis of x and vertex is at the origin , is inversely proportional to the ordinate of the point P

Statement 2: The system of parabola $y^2 = 4ax$ satisfies a differential equation of degree 1 and order 1

A. A) Statement - 1 and statement 2 are both false

B. B) Statement 1 and Statement 2 are both true

C. C) Statement -1 is true and Statement 2 is false

D. D) Statement -1 is false and Statement 2 is false

Answer: B

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43. Statement 1: The line $x - 2y = 2$ meets the parabola $y^2 + 2x = 0$ only at the point $(-2, -2)$

Statement 2: The line $y = mx - 1/2m(m \neq 0)$ is a tangent to the parabola , $y^2 = -2x$ at the point $\left(-\frac{1}{2m^2}, \frac{1}{m}\right)$

A. Statement 1 and Statement 2 are both false

B. Statement 1 and Statement 2 are both true

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: A

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44. The point of intersection of the normals to the parabola $y^2 = 4x$ at the ends of its latus rectum is

A. $(0, 2)$

B. $(3, 0)$

C. $(0, 3)$

D. $(2, 0)$

Answer: B

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45. Let L_1 be the length of the common chord of the curves $x^2 + y^2 = 9$ and $y^2 = 8x$ and L_2 be the length of the latus rectum of $y^2 = 8x$, then

A. $L_1 > L_2$

B. $L_1 = L_2$

C. $L_1 < L_2$

D. $\frac{L_1}{L_2} = \sqrt{2}$

Answer: C

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46. Two tangents are drawn from a point $(-2, -1)$ to the curve $y^2 = 4x$, If α is the angle between them , then $|\tan \alpha|$ is equal to

A. $\frac{1}{3}$

B. $\frac{1}{\sqrt{3}}$

C. $\sqrt{3}$

D. 3

Answer: D

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47. A chord is drawn through the focus of the parabola $y^2 = 6x$ such that its distance from the vertex of this parabola is $\frac{\sqrt{5}}{2}$, then its slope can be

A. $\frac{\sqrt{5}}{2}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{2}{\sqrt{5}}$

D. $\frac{2}{\sqrt{3}}$

Answer: A

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48. Let $y^2 = 16x$ be a given parabola and L be an extremity of its latus rectum in the first quadrant . If a chord is drawn through L with slope -1, then the length of this chord is

A. A) 32

B. B) $16\sqrt{2}$

C. C) $16\sqrt{3}$

D. D) $32\sqrt{2}$

Answer: D

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49. The locus of the mid points of the chords of the prarabola $x^2 = 4py$ having slope m is a

A. line parallel to x-axis at a distance |2pm | from it

B. line parallel to y-axis at a distance | 2pm| from it

C. line parallel to y =mx, m $\neq 0$ at a distance |2pm | from it

D. circle with centre at the origin and radius |2pm|

Answer: B

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50. Let O be the vertex and Q be any point on the parabola , $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio 1: 3 then the locus of P is:

A. $x^2 = y$

B. $y^2 = x$

C. $y^2 = 2x$

D. $x^2 = 2y$

Answer: D

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Ellipse

1. The equation of ellipse whose focus is

$\left(0, \sqrt{a^2 - b^2}\right)$, directrix is y = $\dfrac{a^2}{\sqrt{a^2 - b^2}}$ and eccentricity is $\dfrac{\sqrt{a^2 - b^2}}{a}$

is

A. $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

B. $\dfrac{x^2}{b^2} + \dfrac{y^2}{a^2} = 1$

C. $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 2$

D. $\dfrac{x^2}{b^2} + \dfrac{y^2}{a^2} = 2$

Answer: B

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2. Axes are co-ordinate axes, S and S^1 are Foci, B and B^1 are the ends of minor axis

$\left|SBS^1 = \sin^{-1}\left(\frac{4}{5}\right)\right.$. if area of SB S^1B^1 is 20sq. Units then eq. of the ellipse is

A. A) $\frac{x^2}{20} + \frac{y^2}{16} = 1$

B. B) $\frac{x^2}{25} + \frac{y^2}{16} = 1$

C. C) $\frac{x^2}{25} + \left.\frac{y^2}{4}\right) = 1$

D. D) $\frac{x^2}{25} + \frac{y^2}{20} = 1$

Answer: D

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3. If the ecentricity of the ellipse $\frac{x^2}{a^2+1} + \frac{y^2}{a^2+2} = 1$ be $\frac{1}{\sqrt{6}}$ then length of the latusrectum of the ellipse is

A. $\frac{5}{\sqrt{6}}$

B. $\frac{10}{\sqrt{6}}$

C. $\frac{8}{\sqrt{6}}$

D. $\frac{5}{\sqrt{2}}$

Answer: B

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4. If the length of the semi major axis of an ellipse is 68 and eccentricity is 1/2 then the area of the rectangle formed by joining the ends of the Latusrecta of the ellipse is equal to

A. 6935

B. 6936

C. 6930

D. 6946

Answer: B

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5. A square is inscribed inside the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$then the length of the side of the square is

A. $\frac{ab}{\sqrt{a^2 + b^2}}$

B. $\frac{2ab}{\sqrt{a^2 + b^2}}$

C. $\sqrt{a^2 + b^2}$

D. $\sqrt{a^2 - b^2}$

Answer: B

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6. An ellipse is incribed in a rectangle and if the angle between the diagonals is $\tan^{-1} 2\sqrt{2}$ then e=

A. $\frac{1}{\sqrt{3}}$

B. $\frac{1}{3}$

C. $\frac{1}{\sqrt{2}}$

D. $\frac{1}{2}$

Answer: C

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7. The circle on SS' as diameter intersects the ellipse in real points then its eccentricity

A. $e = \frac{1}{\sqrt{2}}$

B. $e > \frac{1}{\sqrt{2}}$

C. $e < \frac{1}{\sqrt{2}}$

D. $e = \frac{1}{2}$

Answer: B

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8. Let S and S^1 be the foci of an ellipse . At any point P on the ellipse if $SPS^1 < 90^\circ$ then its eccentricity :

A. $e > \frac{1}{\sqrt{2}}$

B. $e < \frac{1}{\sqrt{2}}$

C. $e = \frac{1}{\sqrt{2}}$

D. $e = \frac{1}{2}$

Answer: B

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9. The angle of inclination of the chord joining the ends of major axis and minor axis of an ellipse is $\sin^{-1}\left(\frac{1}{\sqrt{5}}\right)$ then e=

A. $\frac{1}{\sqrt{2}}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. 4

Answer: C

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10. $x^2 + 4y^2 + 2x + 16y + k = 0$ represents an ellipse with ecentricity $\frac{\sqrt{3}}{2}$ for

A. only one value of k

B. only two real values of k

C. infinite number of values of k

D. no real value of k

Answer: B

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11. A conic has latus rectum length 1, focus at (2,3) and the corresponding directrix is x+y -3=0 . Then the conic is

A. a parabola

B. an ellipse

C. a hyperbola

D. a rectangular hyperbola

Answer: C

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12. The total number of real tangents that can be drawn to the ellipse $3x^2 + 5y^2 = 32$ and $25x^2 + 9y^2 = 450$ passing through (3, 5) is

A. 0

B. 2

C. 3

D. 4

Answer: A

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13. A tangent is drawn to the ellipse $\frac{x^2}{27} + y^2 = 1$ at the point $(3\sqrt{3}\cos\theta, \sin\theta)$ where$0 < \theta < \frac{\pi}{2}$ then the sum of the intercepts of the tangent with the coordinate axes is least when $\theta =$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{8}$

D. $\frac{\pi}{4}$

Answer: A

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14. The set of values of 'a' for which $(13x-1)^2+(13y-2)^2=a(5x+12y-1)^2$ represents an ellipse if

A. $1 < a < 2$

B. $2 < a < 3$

C. $0 < a < 1$

D. $3 < a < 4$

Answer: D

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15. A, A^1 are the vertices , S, S^1 are the foci of an ellipse . The tangent at any point 'P' on the ellipse is the external angular bisector of

A. $\lfloor A^1PS$

B. $\lfloor A^1PA$

C. $\lfloor S^1PA$

D. $\lfloor S^1PS$

Answer: A

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16. The point $P\left(\frac{\pi}{4}\right)$ lie on the ellipse $\frac{x^2}{4}+\frac{y^2}{2}=1$ whose foci S and S^{-1}.The equation of the external angular bisector of $SPS^{-1} of \Delta^{\leq} SPS^1$ is

A. $x+\sqrt{2}y=2\sqrt{2}$

B. $2x+3\sqrt{3}y=12$

C. $3x-4y+12\sqrt{2}=0$

D. $x+y+12\sqrt{2}=0$

Answer: D

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17. P is a point on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ with foci at S, S^{-1}. Normal at P cuts the x-axis at G and $\frac{SP}{S^1P}=\frac{2}{3} then \frac{SG}{S^1G}$

A. A) $\frac{4}{9}$

B. B) $\frac{3}{2}$

C. C) $\frac{2a}{3b}$

D. D) $\frac{2}{3}$

Answer: D

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18. The normal at a poitn $P(\theta)$ on the ellipse $5x^2+14y^2=70$ cuts the curve again at a point Q $(2\theta) then \cos\theta$

A. A) $\frac{1}{3}$

B. B) $-\frac{1}{3}$

C. C) $\frac{2}{3}$

D. D) $\frac{-2}{3}$

Answer: B

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19. The major axis of an ellipse is y =x and one vertex is at origin , the other axis of the ellipse , if the length of semi-major axis be 10, can be

A. $x + y = 10$

B. $x + y = 10\sqrt{2}$

C. $x - y = 10$

D. $x + y - 10 = 0$

Answer: B

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20. In a model. It is shown that an arch of abridge is semi-elliptical with major axis horizontal if the length of the base is 9m and the heightest part of the bridge is 3m from the horizontal, then the best approximation of the height of the arch , 2m from the centre of the base is

A. $\frac{11}{4}m.$

B. $\frac{8}{3}m$

C. $\frac{7}{2}m$

D. $2m$

Answer: A

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21. A bridge is in the shape of a semi ellipse . If it is 400 m long and has a maximum height of 10 m at midpoint . The height of the bridge distanced 80m from one end is

A. 8 m

B. 12m

C. 20 m

D. 10 m

Answer: B

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22. (2,4) and (10 , 10) are the ends of the latus rectum of an ellipse with eccentricity 1/2 . The length of major axis is

A. $\frac{20}{3}$

B. $\frac{40}{3}$

C. $\frac{25}{3}$

D. $\frac{80}{3}$

Answer: D

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23. A common tangent to the circle $x^2 + y^2 = 16$ and an ellipse $\frac{x^2}{49} + \frac{y^2}{4} = 1$ is

A. $y = x + \sqrt{45}$

B. $y = x + \sqrt{53}$

C. $\sqrt{11}y = 2x + 4$

D. $\sqrt{11}y = 2x + 4\sqrt{15}$

Answer: D

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24. The equation of common tangents to the ellipse $x^2 + 2y^2 = 1$ and the circle $x^2 + y^2 = \frac{2}{3}$ is

A. $x - \sqrt{2}y + \sqrt{2} = 0$

B. $y = 7x + \sqrt{3}$

C. $y = \sqrt{7x} + \sqrt{2}$

D. $y = 7x - \sqrt{3}$

Answer: A

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25. Let PSP^1 is a focal chord of the ellipse $4x^2 + 9y^2 = 36$ and $SP = 4$, then $S^1P^1 =$

A. $\frac{26}{5}$

B. $\frac{36}{5}$

C. 4

D. 5

Answer: A

Watch Video Solution

26. The locus of the mid points of the normal chords of $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

A. A) $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)\left(\frac{x^6}{a^2}+\frac{y^6}{b^2}\right)=\left(a^2-b^2\right)^2$

B. B) $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)\left(\frac{x^6}{a^2}-\frac{y^6}{b^2}\right)=\left(a^2-b^2\right)^2$

C. C) $\left(\frac{a^6}{x^2}+\frac{b^6}{y^2}\right)\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)=\left(a^2-b^2\right)^2$

D. D) $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)^2\left(\frac{a^6}{x^2}+\frac{b^6}{y^2}\right)=\left(a^2-b^2\right)^2$

Answer: C

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27. Tangents are drawn through the point $(4, \sqrt{3})$ to the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1.$ The points at which these tangents touch the ellipse are

A. $\left(2\frac{3\sqrt{3}}{2}\right), (4, 0)$

B. $\left(2, \frac{\sqrt{3}}{\sqrt{2}}\right), \left(4, \frac{\sqrt{3}}{2}\right)$

C. $\left(4, \frac{3\sqrt{3}}{\sqrt{3}}\right)$, $(2, 0)$

D. $(2, 0)$, $(4, 0)$

Answer: A

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28. The locus of the foot of the perpendicular drawn from the centre of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ to any of its tangents is

A. $(x^2 - y^2)^2 = a^2x^2 + b^2y^2$

B. $(x^2 - y^2) = a^2x^2 - b^2y^2$

C. $(x^2 + y^2)^2 = a^2x^2 + b^2y^2$

D. $(x^2 + y^2)^2 = a^2x^2 - b^2y^2$

Answer: C

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29. The locus of the mid points of parallel chords of an ellipse is a strraight line

A. A) parallel to the major axis

B. B) parallel to the minor axis

C. C) passing through one focus

D. D) passing through the center

Answer: D

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30. If the locus of the mid points of the chords of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, drawn parallel to $y=m_1 x is y=m_2 x$ then $m_1 m_2 =$

A. $\frac{b^2}{a^2}$

B. $\frac{a^2}{b^2}$

C. $\frac{-b^2}{a^2}$

D. $\frac{-a^2}{b^2}$

Answer: C

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31. A point moves such that the distance from the point (2,0) is always 1/3 of its distance from the line x-18=0 . If the locus of a point is conic its length of latus rectum.

A. $16/3$

B. $32/3$

C. $8/3$

D. $15/4$

Answer: B

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32. Tangents are drawn to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=a+b$ at the points where it is cut by the line $\frac{x}{a^2}\cos\theta-\frac{y}{b^2}\sin\theta=1$, then the point of intersection of Tangents

A. $\{(a+b)\cos\theta) \quad -(a+b)\sin\theta\}$

B. $\{(a-b)\cos\theta \quad -(a-b)\sin\theta\}$

C. $\{(a+b)\sin\theta \quad -(a+b)\cos\theta\}$

D. $\{(a+b)\cos\theta \quad -(a-b)\sin\theta\}$

Answer: A

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33. The nature of inter cepts made on the axes by the tangent at the point $\left(\frac{16}{5},\frac{9}{5}\right)$ to the ellipse $9x^2+16y^2=144$ are

A. equal

B. unequal

C. equal in magnitude but opposite in sign

D. interpts in the ratio 1:2

Answer: A

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34. 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 does not lie in

A. $[4, 5]$

B. $(\infty, 2) \cup (3, \infty)$

C. $(-\infty, 0)$

D. $[2, 3]$

Answer: D

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35. Angle substended by common tangents of two ellipse $4(x-4)^2 + 25y^2 = 100$ and $4(x+1)^2 + y^2$ =4 at origin is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{2}$

Answer: D

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36. The line $x = t^2$ meet the ellipse $x^2 + \frac{y^2}{9} = 1$ in the real and distinct points if and only if

A. $|t| < 2$

B. $|t| < 1$

C. $|t| > 1$

D. None of these

Answer: B

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37. If S and S' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, and P is any point on it then range of values of $SP.\,S'P$ is

A. $9 \leq f(\theta) \leq 16$

B. $9 \leq f(\theta) \leq 25$

C. $16 \leq f(\theta) \leq 25$

D. $1 \leq f(\theta) \leq 16$

Answer: C

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38. If a tangent of slope 2 of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is normal to the circle $x^2+y^2+4x+1=0$,then the maximum value of ab is

A. 4

B. 2

C. 1

D. None of these

Answer: A

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39. Statement 1: In a triangle ABC , If base BC is fixed and perimeter of the triangle is constant, then vertex A moves on an Ellipse.

Statement 2: If the sum of distances of a point P from two fixed points is constant then locus of P is a real ellipse

A. Both the statement are True and statement 2 is the correct explanation of statement 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1

C. Statement 1 is True and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: C

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40. An ellipse drawn by taking a diameter of the circle $(x-1)^2+y^2=1$ as its semiminor axis and a diameter of the circle $x^2+(y-2)^2=4$ as its semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is

A. $4x^2+y^2=4$

B. $x^2+4y^2=8$

C. $4x^2 + y^2 = 8$

D. $x^2 + 4y^2 = 16$

Answer: D

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41. Statement 1: In an ellipse the sum of the distances between foci is always less than the sum of focal distances of any point on it.

Statement 2: The eccentricity of any ellipse is less than I.

A. Both the statement are True and statement 2 is the correct explanation of statement 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: A

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42. Statement 1: Any chord of the conic $x^2 + y^2 + xy = 1$ through (0,0) is bisected at (0,0)

Statement 2: The centre of a conic is a point through which every chord is bisected.

A. Both the statement are True and statement 2 is the correct explanation of statement 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: A

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43. Statement 1: The area of the ellipse $2x^2 + 3y^2 = 6$ is more than the area of the circle $x^2 + y^2 - 2x + 4y + 4 = 0$

Statement 2: The length of semi-major axis of an ellipse is more than the radius of the circle.

A. Both the statement are True and statement 2 is the correct explanation of statement 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: B

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44. Statement 1: An equation of a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4 is y = 2x + 2\sqrt{3}$.

Statement 2: If the line $y = mx + \frac{4\sqrt{3}}{m}, (m \neq 0)$ is a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4$, then m satisfies $m^4 + 2m^2 = 24$.

A. Both the statement are True and statement 2 is the correct explanation of statement 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and statement 2 is true.

Answer: B

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45. The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$, and having centre at (0,3) is

A. $x^2+y^2-6y-7=0$

B. $x^2+y^2-6y+7=0$

C. $x^2+y^2-6y-5=0$

D. $x^2+y^2-6y+5=0$

Answer: A

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46. The locus of the foot of perpandicular drawn from the centre of the ellipse $x^2+3y^2=6$ on any tangent to It is

A. $\left(x^2-y^2\right)^2=6x^2+2y^2$

B. $\left(x^2-y^2\right)^2=6x^2-2y^2$

C. $\left(x^2+y^2\right)^2=6x^2+2y^2$

D. $\left(x^2+y^2\right)^2=6x^2-2y^2$

Answer: C

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47. If and c are positive real number and the ellipse $\frac{x^2}{4c^2}+\frac{y^2}{c^2}=1$ has four distinct points in the common with circle $x^2+y^2=9a^2$ then

A. $9ac-9a^2-2c^2<0$

B. $6ac+9a^2-2c^2<0$

C. $9ac-9a^2-2c^2>0$

D. $6ac+9a^2-2c^2>0$

Answer: C

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48. Let the equation of two ellipse be $E_1 : \frac{x^2}{3} + \frac{y^2}{2} = 1$ and $E_2 : \frac{x^2}{16} + \frac{y^2}{b^2} = 1$ If the product of their eccentricities is 1/2 , then the length of the minor axis of E_2 is

A. 8

B. 9

C. 4

D. 2

Answer: D

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49. If the curves $\frac{x^2}{\alpha} + \frac{y^2}{4} = 1$ and $y^3 = 16x$ intresect at right angles, then a value of α is

A. 2

B. $4/3$

C. $1/2$

D. $3/4$

Answer: A

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50. A point on the ellipse $4x^2 + 9y^2 = 36$ where the normal is parallel to the line $4x - 2y - 5 = 0$ is

A. $\left(\frac{9}{5}, \frac{8}{5}\right)$

B. $\left(\frac{8}{5}, \frac{-9}{5}\right)$

C. $\left(-\frac{9}{5}, \frac{8}{5}\right)$

D. $\left(\frac{8}{5}, \frac{9}{5}\right)$

Answer: A

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51. If OB is the semi-minor axis of an ellipse , F_1 and F_2 are its foci and the angle between F_1B and F_2B is a right angle , then the square of the eccentricity of the ellipse is

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. $\frac{1}{2\sqrt{2}}$

D. $\frac{1}{4}$

Answer: A

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52. The minimum area of a triangle formed by any tangent to the ellipse $\frac{x^2}{16}+\frac{y^2}{81}=1$ and the cordinate axes is

A. 12

B. 18

C. 26

D. 36

Answer: D

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53. The tangent to the ellipse $3x^2 + 16y^2 = 12$,at the point $(1, 3/4)$, interects the curve $y^2 + x = 0$ at

A. no point

B. exactly one point

C. two distnct point

D. more than two points

Answer: B

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54. let P be a point the first quadrant lying on the ellipse $9x^2 + 16y^2 = 144$, such that the tangent at P to the ellipse is inclined at an angle 135° to the positive direction of x-axis Then the coordinates of P are

A. $\left(\frac{\sqrt{143}}{3}, \frac{1}{4}\right)$

B. $\left(\frac{8}{9}, \frac{\sqrt{77}}{3}\right)$

C. $\left(\frac{4}{\sqrt{2}}, \frac{3}{\sqrt{2}}\right)$

D. $\left(\frac{16}{5}, \frac{9}{5}\right)$

Answer: D

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55. The area (in sq . Unit) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ is

A. $\frac{27}{4}$

B. 18

C. $\frac{27}{2}$

D. 27

Answer: D

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Hyperbola

1. The equation of the transverse and cojugate axes of a hyperbola are respectively $x+2y-3=0, 2x-y+4=0$ and their respectively length are $\sqrt{2}$ and $2/\sqrt{3}$. The equation of the hyperbola is

A. $\frac{2}{5}(2x-y+4)^2-\frac{3}{5}(x+2y-3)^2=1$

B. $\frac{2}{5}(2x-y+3)^2-\frac{3}{5}(x+2y-3)^2=1$

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

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

Answer: A

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2. The equation

$$\left|\sqrt{(x-2)^2+(y-1)^2}-\sqrt{(x+2)^2+y^2}=c\right.$$

will represent a hyperbola if

A. $c\in(0,6)$

B. $c\in(0,5)$

C. $c\in\left(0,\sqrt{17}\right)$

D. $c\in R$

Answer: C

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3. The equation

$$\left|\sqrt{(x-2)^2+(y-1)^2}-\sqrt{(x+2)^2+y^2}=c\right.$$

will represent a hyperbola if

A. $\frac{3}{13}$

B. $\frac{\sqrt{3}}{3}$

C. $\sqrt{13}$

D. 3

Answer: B

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4. The equation of the common tangent to $y^2=4x$ and $3x^2-4y^2=12$ are

A. $y=\pm(x+2)$

B. $y=\pm(x+1)$

C. $2y = \pm(x+1)$

D. $y = \pm 2(x+1)$

Answer: B

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5. Equation of the common tangents of $\frac{x^2}{y^2} \pm \frac{y^2}{b^2} = 1, \frac{x^2}{b^2} \pm \frac{y^2}{a^2} = \pm 1$ are

A. $y = \pm x \pm \sqrt{a^2 - b^2}$

B. $y = \pm x \pm 2\sqrt{a^2 + b^2}$

C. $y = \pm x \pm \sqrt{a^2 + b^2}$

D. $y = \pm x \pm 2\sqrt{a^2 - b^2}$

Answer: A

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6. Find the equation of the chord joining two points (x_1, y_1) and (x_2, y_2) on t he rectangular hyperbola $xy = c^2$

A. $\frac{x}{x_1 + x_2} + \frac{y}{y_1 + y_2}$

B. $\frac{x}{x_1 - x_2} + \frac{y}{y_1 - y_2} = 1$

C. $\frac{x}{y_1 + y_2} + \frac{y}{x_1 + x_2} = 1$

D. $\frac{x}{y_1 - y_2} + \frac{y}{x_1 - x_2} = 1$

Answer: A

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7. The locus of the points of intersection of tangents to the hyperbola $x^2 - y^2 = a^2$which include an angle of 45° is

A. $(x^2 + y^2)^2 = 4a^2(x^2 + y^2 + a^2)$

B. $(x^2 + y^2)^2 = 4a^2(x^2 - y^2 + a^2)$

C. $(x^2 + y^2)^2 = 4a^2(y^2 - x^2 + a^2)$

D. $\left(x^2+y^2\right)^2=4a^2\left(x^2+y^2-a^2\right)$

Answer: C

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8. For the hyperbola $\frac{x^2}{\cos^2\alpha}-\frac{y^2}{\sin^2\alpha}=1$ Which of the following remains constant when α varies ?

A. abscissae of foci

B. eccentricity

C. directrix

D. abscissae of vertices

Answer: A

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9. The foci of the ellips $\frac{x^2}{16}+\frac{y^2}{b^2}=1$ and the hyperbola $\frac{x^2}{144}-\frac{y^2}{81}=\frac{1}{25}$ coincide ,then the value of b^2 is

A. 5

B. 7

C. 9

D. 1

Answer: B

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10. If (3,1) is a focus and x= 0 is the corresponding directrix of a conic with accentricity 2, then its vertices are

A. $(1, 1)(-3, 1)$

B. $(2, 1)(-3, 1)$

C. $(1, 1)(6, 1)$

D. $(1, -1), (1, -3)$

Answer: A

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11. If the normal at the point t_1 to the rectangle hyperola $xy = c^2$ meets it again at the point t_2 prove that $t_1^3 t_2 = -1$

A. 2

B. -2

C. -1

D. 1

Answer: C

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12. The length of the semi treansverse axis of the rectangular hyperbola $xy = 32$ is

A. 32

B. 16

C. 64

D. 8

Answer: D

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13. Focii of the curve xy = -4 are

A. $(\sqrt{2}, \ -\sqrt{2})(-\sqrt{2}, \ -\sqrt{2})$

B. $(2\sqrt{2}, \ -2\sqrt{2}), (-2\sqrt{2}, \ -2\sqrt{2})$

C. $(-2\sqrt{2}, 2\sqrt{2}), (2\sqrt{2}, \ -2\sqrt{2})$

D. $(-\sqrt{3}, \sqrt{3})(\sqrt{3}, \ -\sqrt{3})$

Answer: C

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14. Length of the principal axis of the hyperbola $xy = 32$ is

A. 8

B. 16

C. $8\sqrt{2}$

D. $\sqrt{2}$

Answer: B

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15. If $(x_i y_i), i = 1, 2, 3, 4$ are concylic points on $xy = 4$ then $x_1 x_2 x_3 x_4 =$

A. 4

B. -4

C. -16

D. 16

Answer: D

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16. If $(x_i y_i), i = 1, 2, 3, 4$ are concyclic points on $xy = c^2$ and if $y_1 . y_2 . y_3 . y_4 = 4$ then c^2 =

A. 16

B. 4

C. 1

D. 2

Answer: D

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17. The locus a point P (α, β) moving under the condition that the line y= $\alpha x + \beta$ is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

A. a parabola

B. an ellipse

C. a hyperbola

D. a circle

Answer: C

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18. The auxiliary circle of the hyperbola $xy = 9$ is:

A. $x^2 + y^2 = 9$

B. $x^2 + y^2 = 6$

C. $x^2 + y^2 = 18$

D. $x^2 + y^2 = 36$

Answer: C

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19. If a hyperbola has one focus at the origin and its eccentricity is $\sqrt{2}$ .One of the directrices is $x + y + 1 = 0$. Then the centre of the hyperbola is

A. $(-1, 1)$

B. $(1, -1)$

C. $(-2, -1)$

D. $(2, 2)$

Answer: A

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20. If a hyperbola has one focus at the origin and its eccentricity is $\sqrt{2}$. One of the directrices is $x+y+1=0$, Then equation its asymptotes are

A. $x=1, y=1$

B. $x+1=0, y+1=0$

C. $x=3, y=3$

D. $x+3=0, y+3=0$

Answer: B

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21. The point of intersection of the asymptotes with the directrices lie on

A. Director circle

B. Auxiliary circle

C. Circle on SS^1 diameter

D. None

Answer: B

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22. If a hyperbola passing through the origin has $3x - 4y - 1 = 0$ and $4x - 3y - 6 = 0$ as its asymptotes , then the equation of its transverse and conjugate axes are

A. $x - y - 5 = 0$ and $x + y + 1 = 0$

B. $x - y = 0$ and $x + y + 5 = 0$

C. $x + y - 5 = 0$ and $x - y - 1 = 0$

D. $x + y - 1 = 0$ and $x - y - 5 = 0$

Answer: C

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23. The eccentricity of the hyperbola

$3x^2 + 7xy + 2y^2 - 11x - 7y + 10 = 0$ is

A. $\sqrt{2}$

B. $\dfrac{2\sqrt{2}}{\sqrt{2}+1}$

C. $\sqrt{\dfrac{2\sqrt{2}}{\sqrt{2}+1}}$

D. $\sqrt{\dfrac{2\sqrt{2}}{\sqrt{2}-1}}$

Answer: C

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24. If H(x,y) =0 represents the equation of a hyperbola and A(x,y) =0 ,C(x,y) =0 the joint equation of its asymptotes and the conjugate hyperbola respectively , then for any point (a,b) in the plane H(a,b) ,A(a,b) and C(a,b) are in

A. A.P.

B. G.P.

C. H.P.

D. A.G.P

Answer: A

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25. The equation of a hyperbola conjugate to the hyperbola $2x^2 + 3xy - 2y^2 + 3x + y + 2 = 0$ is $2x^2 + 3xy - 2y^2 + 3x + y + k = 0$ then k=

A. 0

B. 1

C. -4

D. 4

Answer: A

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26. The equation to the conjugate hyperbola of $xy + 3x - 4y + 13 = 0$ is

A. $(x - 4)(y + 3)$

B. $(x - 4)(y + 3) = 0$

C. $(x - 4)(y + 3) = 25$

D. $xy + x - 4y - 13 = 0$

Answer: C

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27. A = (1,2) , B= (6,-10) locus of P such that PA- PB =13 is

A. a hyperbola

B. a part of a hyperbola

C. a ray with vertex at B not containing A

D. a line segment

Answer: C

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28. s= 0 is a hyperbola , if s+ k =0 (k is a real number) represents equation of the asymptotes than s+ 2k =0 represents

A. hyperbola

B. Ellipse

C. parabola

D. Circle

Answer: A

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29. If the distances between two parallel tangents drawn to the hyperbola $\frac{x^2}{9} - \frac{y^2}{49} = 1$ is 2 , then their slope is equal to

A. $\pm\frac{5}{2}$

B. $\pm\frac{4}{5}$

C. $\perp\frac{7}{2}$

D. ± 5

Answer: A

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30. A tangent drawn to hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at $P\left(\frac{\pi}{6}\right)$ forms a triangle of area $3a^2$ square units , with coordinates axes, then the square of its eccentricity is

A. 15

B. 24

C. 17

D. 14

Answer: C

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31. The sides AC and AB of a ΔABC touch the conjugate hyperbola of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$. If the vertex A lies on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$,then the side BC must touch

A. Parabola

B. circle

C. hyperbola

D. ellipse

Answer: D

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32. If values of m for which the line $y = mx + 2\sqrt{5}$ touches the hyperbola $16x^2 - 9y^2 = 144$ are roots of the equation $x^2 - (a+b)x - 4 = 0$ then value of $(a+b)$ is equal to

A. 2

B. 4

C. zero

D. 5

Answer: C

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33. If a ray of light incident along the line $3x + (5 - 4\sqrt{2})y = 15$ gets reflected from the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ then reflected ray goes along the line

A. $x\sqrt{2} - y + 5 = 0$

B. $\sqrt{2}y - x + 5 = 0$

C. $\sqrt{2}y - x - 5 = 0$

D. $3x - (4\sqrt{2} + 5)y + 15 = 0$

Answer: D

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34. Statement I: Asymptotes of hyperbola $3x + 4y = 2$ and $4x - 3y = 5$ are bisectors of transverse and conjugate axes of hyperbola

Statement II : Transverse and conjugate axes of hyperbola are bisectors of the asymptotes Then correct statement is

A. Both the statement are True and statement II is the correct explanation of statement I.

B. Both the statement are True but Statement II is Not the correct explanation of Statement I.

C. statement -I is True and Statement -II is False

D. statement -I is False and statement -II is True

Answer: B

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35. If S_1 and S_2 are the foci of the hyperbola whose transverse axis length is 4 and conjugate axis length is 6,S_3 and S_4 are the foci of the conjugate hyperbola , then the area of the quadrilateral $S_1, S_2, S_3, S_4 is$

A. 24

B. 26

C. 22

D. 12

Answer: B

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36. Statement 1 : Ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and $12x^2 - 4y^2 = 27$ intersect each other at right angle

Statement 2: Given ellipse and hyperbola have same foci

Then correct statement is

A. Both the statement are True and 2 is the correct explanation of 1

B. Both the statement are True but Statement 2 is Not the correct explanation of Statement 1.

C. statement -1 is True and Statement -2 is False

D. statement -1 is False and statement -2 is True

Answer: A

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37. Statement 1: If a circle S = 0 intersects a hyperbola xy =4 at four points , Three of them are $(2, 2), (4, 1)$ and $(6, 2/3)$ then coordinates of the fouth points are $(1/4, 16)$

Statement 2: If a circle S=0 intersects a hyperbola $xy = c^2$ at t_1, t_2, t_3, t_4 then $t_1 . t_2 . t_3 . t_4 = 1.$ Then correct statement is

A. Both the statement are True and II is the correct explanation of I

B. Both the statement are True but Statement II is Not the correct explanation of Statement I.

C. statement -I is True and Statement -II is False

D. statement -I is False and statement -II is True

Answer: D

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38. Statement 1: Equation of tangents to the hyperbola $2x^2 - 3y^2 = 6$ which is parallel to the line $y = 3x + 4$ is y= 3x-5 and y=3x +5

Statement 2: For given slope two parallel tangents can be drawn to the hyperbola

A. Both the statement are True and II is the correct explanation of I

B. Both the statement are True but Statement II is Not the correct explanation of Statement I.

C. statement -I is True and Statement -II is False

D. statement -I is False and statement -II is True

Answer: B

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39. Statement 1 : There are infinite points from which two mutually perpendicular tangents can be drawn to the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$

Statement 2: The locus of point of intersection of perpendicular tangent at one of the points of contact is

A. $x+\sqrt{3}y+2=0$

B. $3x-2\sqrt{2}y-3=0$

C. $3x-\sqrt{2}y+6=0$

D. $x-\sqrt{3}y+2=0$

Answer: D

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40. If x= 9 is a chord of contact of the hyperbola $x^2-y^2=9$, then the equation of the tangents at one of the points of contact is

A. $x+\sqrt{3}y+2=0$

B. $3x-2\sqrt{2}y-3=0$

C. $3x-\sqrt{2}y+6=0$

D. $x - \sqrt{3}y + 2 = 0$

Answer: B

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41. Statement 1 : If (3,4) is point on a hyperbola having focus (3,0) and $(\lambda, 0)$ and length of the transverse axis being 1 units then λ can take the value 0 or 3

Statement 2 : `| S' P -SP | =2 a where S and S' are two foci 2a= length of the transverse axis and P be any points on the hyperbola Then the correct statement is

A. Both the statement are True and II is the correct explanation of I

B. Both the statement are True but Statement II is Not the correct explanation of Statement I.

C. statement -I is True and Statement -II is False

D. statement -I is False and statement -II is True

Answer: D

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42. A tangent to the hyperbola $\frac{x^2}{4} - \frac{y^2}{2} = 1$ meets x-axis at P and y-axis at Q . Lines PR and QR are drawn such that OPRQ is a rectangle (where O is the origin) then R lies on

A. $\frac{4}{x^2} + \frac{2}{y^2}$

B. $\frac{2}{x^2} - \frac{4}{y^2} = 1$

C. $\frac{2}{x^2} + \frac{4}{y^2} = 1$

D. $\frac{4}{x^2} - \frac{2}{y^2} = 1$

Answer: D

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43. A common tangent to the conic $x^2 = 6y$ and $2x^2 - 4y^2 = 9$ is

A. $x - y = 3/2$

B. $x + y = 1$

C. $x + y = 9/2$

D. $x - y = 1$

Answer: A

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44. If $P(3\sec\theta, 2\tan\theta)$ and $Q(3\sec\phi, 2\tan\phi)$ where$\theta + \phi = \frac{\pi}{2}$, be two distinct points on the hyperbola $\frac{x^2}{9} - \frac{y^2}{4}$ =1 . Then the coordinate of the points of intersection of the normals at P and Q is

A. $\frac{11}{3}$

B. $-\frac{11}{3}$

C. $\frac{13}{2}$

D. $-\frac{13}{2}$

Answer: D

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45. A common tangent to $x^2 - 2y^2 = 18$ and $x^2 + y^2 = 9$ is

A. $y = 2x + 3\sqrt{5}$

B. $y = \sqrt{2}x + 3\sqrt{3}$

C. $y = 2x + 3\sqrt{7}$

D. $y = \sqrt{2}x + 3\sqrt{5}$

Answer: B

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46. The tangents at an extremity (in the first quadrant) of latus rectum of the hyperbola $\frac{x^2}{4} - \frac{y^2}{5} = 1$ meets x-axis and y- axis at A and B respectively . Then $(OA)^2 - (OB)^2$, where O is the origin , equals

A. $-\frac{20}{9}$

B. $\frac{16}{9}$

C. 4

D. $-\frac{4}{3}$

Answer: A

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Straight Lines

1. If the lines $\frac{x+1}{2}=\frac{y-1}{1}=\frac{z+1}{3}$ and $\frac{x+2}{2}=\frac{y-k}{3}=\frac{z}{4}$ are , coplanar , then the value of k is

A. $11/2$

B. $-11/2$

C. $9/2$

D. $-9/2$

Answer: A

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2. Let Q be the foot the perpendicular from the origin to the plane $4x - 3y + z + 13 = 0$ and R be the points $(-1, 1, -6)$ on the plane Then length QR is

A. $\sqrt{14}$

B. $\sqrt{19/2}$

C. $3\sqrt{7/2}$

D. $3/\sqrt{2}$

Answer: C

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3. The angle between the lines whose direction cosines satisfy the equations $l + m + n = 0$ and $l^2 = m^2 + n^2$ is

A. 15°

B. 30°

C. 60°

D. 45°

Answer: C

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4. If the lines L_1 and L_2 in space are defined by $L_1 = \{x = \sqrt{\lambda}y + (\lambda - 1)z = (\sqrt{\lambda} - 1)y + \sqrt{\lambda})$ and $L_2 = \{x = \sqrt{\mu}y +$ then L_1 is perpendicular to L_2 for all non- negative reals λ and μ such that

A. $\sqrt{\lambda} + \sqrt{\mu} = 1$

B. $\lambda \neq \mu$

C. $\lambda + \mu = 0$

D. $\lambda = \mu$

Answer: D

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5. If the projection of a line segment on the x, y and z -axes in 3 dimensional space are 2,3 and 6 respectively, then the length of the line segment is

A. 12

B. 7

C. 9

D. 6

Answer: B

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6. Let ABC be a triangle with vertices at points $A(2, 3, 5), B(-1, 3, 2)$ and $(\lambda, 5, \mu)$ in three dimensional space. If the median through A is equally inclined with the axes , then (λ, μ) is equal to

A. $(0, 7)$

B. $(7, 5)$

C. $(7, 10)$

D. $(5, 7)$

Answer: A

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7. The equation of a plane through the line of intersection of the planes $x+2y=3y-2z+1=0$ and perpendicular to the first plane is

A. $2x - y - 10z = 9$

B. $2x - y + 7z = 11$

C. $2x - y + 10z = 11$

D. $2x - y - 9z = 10$

Answer: C

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8. Equation of a plane which passes through the point of intersection of lines $\frac{x-1}{3} = \frac{y-2}{1} = \frac{z-3}{2}$ and $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ and at greatest distance from the origin is

A. $7x + 2y + 4z = 54$

B. $3x + 4y + 5z = 49$

C. $4x + 3y + 5z = 50$

D. $5x + 4y + 3z = 57$

Answer: C

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9. Let A (2,3,5) , B (-1,3,2) and $C(\lambda, 5, \mu)$ be the vertices of $a\Delta ABC$, If the median through A is equally inclined to the coodinate axes, then

A. $5\lambda - 8\mu = 0$

B. $8\lambda - 5\mu = 0$

C. $10\lambda - 7\mu = 0$

D. $7\lambda - 10\mu = 0$

Answer: C

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10. A line in 3 dimensional space makes an angle $\theta(0 < \theta \leq \pi/2)$ with both the x and y axex . Then the set of all values of θ is the interval

A. $\left(0, \frac{\pi}{4}\right)$

B. $\left[\frac{\pi}{6}, \frac{\pi}{3}\right]$

C. $\left[\frac{\pi}{4}, \frac{\pi}{2}\right]$

D. $\left[\frac{\pi}{3}, \frac{\pi}{2}\right]$

Answer: C

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11. The plane containing the line $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3}$ and parallel to the line $\frac{x}{1} = \frac{y}{1} = \frac{z}{4}$ passes through the point

A. $(1, -2, 5)$

B. $(1, 0, 5)$

C. $(0, 3, -5)$

D. $(-1, -3, 0)$

Answer: B

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12. A symmetrical form of the line of intersection of the planes $x = ay + b$ and $z = cy + d$ is

A. $\frac{x-b}{a} = \frac{y-1}{1} = \frac{z-d}{c}$

B. $\frac{x-b-a}{a} = \frac{y-1}{1} = \frac{z-d-c}{c}$

C. $\frac{x-a}{b} = \frac{y-0}{1} = \frac{z-c}{d}$

D. $\frac{x-b-a}{b} = \frac{y-1}{0} = \frac{z-d-c}{d}$

Answer: B

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13. If the distance between the planes $4x - 2y - 4z + 1 = 0$ and $4x - 2y - 4z + d = 0 is 7$, then d is

A. $41 \text{ or } -42$

B. $42 \text{ or } -43$

C. $-41 \text{ or } 43$

D. $-42 \text{ or } 44$

Answer: C

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14. Equation of the line of shortest distance between the lines $\frac{x}{1} = \frac{y}{-1} = \frac{z}{1}$ and $\frac{x-1}{0} = \frac{y+1}{-2} = \frac{z}{1}$ is

A. $\frac{x}{1} = \frac{y}{-1} = \frac{z}{2}$

B. $\frac{x-1}{1} = \frac{y+1}{-1} - \frac{z}{-2}$

C. $\frac{x-1}{1} = \frac{y+1}{1} = \frac{z}{1}$

D. $\frac{x}{2} = \frac{y}{1} = \frac{z}{2}$

Answer: B

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15. If the angle theline $2(x+1)=y=z+4$ and the plane $2x-y+\sqrt{\lambda}z+4=0$ is $\frac{\pi}{6}$, then the value of λ is

A. $\frac{135}{7}$

B. $\frac{45}{11}$

C. $\frac{45}{7}$

D. $\frac{135}{11}$

Answer: C

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16. Shortest distance between z-axis and the line $\frac{x-2}{3}=\frac{y-5}{2}=\frac{z+1}{-5}$ is

A. $1/\sqrt{13}$

B. $11/13$

C. $\sqrt{11}/13$

D. $11/\sqrt{13}$

Answer: D

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17. Let L be the line $x-4=y-2=\frac{z-7}{2}$ and P be the plane 2x - 4y +z =7

Statement 1: The line L lies in the plane P

Statement 2: The direction ratios of the line L are $l_1=1, m_1=1, n_1=2$ and that of the normal to the plane P are $l_2=2, m_2=-4, n_2=1$ and $l_1l_2+m_1m_2+n_1n_2=0$ holds

A. Both the statement are True and II is the correct explanation of I

B. Both the statement are True but Statement II is Not the correct explanation of Statement I.

C. statement -I is True and Statement -II is False

D. statement -I is False and statement -II is True

Answer: B

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18. The angle between the lines $2x = 3y = -z$ and $-6x = y = -4z$ is

A. 30°

B. 45°

C. 90°

D. 0°

Answer: C

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19. The reflection point of the point $(0, 3, -2)$ on the line $\frac{1-x}{2} = 2 - y = z + 1$ is

A. $(1, 2, -1)$

B. $(2, 1, 4)$

C. $(2, 1, 0)$

D. $(0, 0, 1)$

Answer: C

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20. A variable plane passes through a fixed point (1,-2,3) and meets the coordinates axes at points A,B, C then the point of intersection of the planes thorugh A,B ,C parallel to the coordinates planes lies on

A. $xy - (1/2)yz + (1/3)zx = 6$

B. $yz - 2zx + 3xy = xyz$

C. $xy - 2yz + 3zx = 3xyz$

D. $xy + (1/2)yz - (1/3)zx = 6$

Answer: B

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21. The distance of the point (1,0,2) from the point of intersection of the line

$\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane

$x - y + z = 16$ is

A. $2\sqrt{14}$

B. 8

C. $3\sqrt{21}$

D. 13

Answer: D

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22. The number of distinct real values of λ for which the lines $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z+3}{\lambda^2}$ and $\frac{x-3}{1} = \frac{y-2}{\lambda^2} = \frac{z-1}{2}$ are coplanar is

A. 2

B. 4

C. 3

D. 1

Answer: C

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23. The distance of the point $(1, -5, 9)$ from the plane $x - y + z = 5$ measured along a straight line $x = y = z$ is

A. $\frac{20}{3}$

B. $3\sqrt{10}$

C. $10\sqrt{3}$

D. $\frac{10}{\sqrt{3}}$

Answer: C

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24. If the line, $\frac{x-3}{2}=\frac{y+2}{-1}=\frac{z+4}{3}$ lies in the plane, $lx+my-z=9$, then l^2+m^2 is equal to

A. 2

B. 26

C. 18

D. 5

Answer: A

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