MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

UNIT TEST PAPER NO. 2 (GEOMETRIES)

Select The Correct Answer

1. The point $(4, 1)$ undergoes the following two successive transformations

(i) Reflection about the line $y = x$

(ii) Translation through a distance 2 units along the positive X-axis.

Then the final coordinate of the point are

A. (4, 3)

B. (3, 4)

C. (1, 4)

D. $(7/2, 2/7)$

Answer: B

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2. The number of integral values of m for which the x-coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer is 2 (b) 0 (c) 4 (d) 1

A. 2

B. 0

C. 4

D. 1

Answer: A

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3. A variable circle passes through the fixed point A(p, q) and touches x-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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4. On the ellipse $4x^2 + 9y^2 = 1$, the points at which the tangent are parallel to the line $8x = 9y$ are

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

B. $(-2/5, 1/5)$

C. $(-2/5, -1/5)$

D. None of these.

Answer: B

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5. Which one of the following is independent of α in the hyperbola $\left(0 < \alpha < \frac{\pi}{2}\right) \frac{x^2}{\cos^2 \alpha} - \frac{y^2}{\sin^2 \alpha} = 1$

A. eccentricity

B. abscissa of foci

C. directrix

D. vertex.

Answer: B

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6. Volume of a tetrahedron is k (area of one face) (length of perpendicular from the opposite vertex upon it), where k is :

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

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

C. $\frac{1}{6}$

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

Answer: B

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7. Area of the triangle with vertices (a, b), (x_1, y_1) and (x_2, y_2), where a, x_1, x_2 are in G.P. with common ratio r and b, y_1, y_2 are in G.P. with common ratio s is :

A. $ab(r-1)(s-1)(s-r)$

B. $\frac{1}{2}ab(r+1)(s+1)(s-r)$

C. $\frac{1}{2}ab(r-1)(s-1)(s-r)$

D. $ab(r+1)(s+1)(r-s)$

Answer: C

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8. $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel straight lines if

A. $\sqrt{\frac{g^2 - ac}{h^2 + a^2}}$

B. $2\sqrt{\frac{g^2 - ac}{h^2 + a^2}}$

C. $2\sqrt{\frac{g^2 - ac}{a(a + b)}}$

D. $\sqrt{\frac{g^2 - ac}{a(a + b)}}$

Answer: C

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9. The lines joining the origin to the points of intersection of the curves :

$ax^2 + 2hxy + by^2 + 2gx = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x = 0$

are ate right angles if :

A. $a(h' + g') = a'(h + g)$

B. $h(a' + b') = h'(a + b)$

C. $g(a' + b') = g'(a + b)$

D. $g(a + b) = g'(a' + b')$.

Answer: C

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10. Range of volues of m for which the st. line $y = mx + 2$ cuts the circle $x^2 + y^2 = 1$ in distinct or coincident points is:

A. $[-\sqrt{3}, \sqrt{3}]$

B. $[\sqrt{3}, \infty)$

C. $(-\infty, -\sqrt{3}] \cup [\sqrt{3}, \infty)$

D. None of these.

Answer: C

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11. The abscissae of two points P and Q are the roots of the equation $x^2 + 2ax - b^2 = 0$ and their ordinates are the roots of the equation $x^2 + 2a'x - b'^2 = 0$. Then the radius of the circle having PQ as diameter is:

A. $\sqrt{a^2 + a'^2}$

B. $\sqrt{b^2 + b'^2}$

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

D. None of these.

Answer: C

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12. 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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13. If two circle $(x-1)^2 + (y-3)^2 = r^2$ 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. $2 < r < 8$

Answer: D

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14. The normal at the point $\left(bt_1^2, 2bt_1\right)$ on a parabola meets the parabola again in the point $\left(bt_2^2, 2bt_2\right)$, 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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15. The radius of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, and having its centre (0, 3) is :

A. 4

B. 3

C. $\sqrt{12}$

D. $\frac{7}{2}$

Answer: A

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16. Let $P(a\sec\theta, b\tan\theta)$ and $Q(a\sec\varphi, b\tan\varphi)$ where $\theta+\varphi=\frac{\pi}{2}$ be two points on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$. If (h, k) is the point of intersection of the normals at P and Q, then $k=$

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

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

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

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

Answer: D

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17. The points representing $\sqrt[3]{5+i\sqrt{3}}$ lie.

A. circle with centre at (0, 0) radius $2\sqrt{2}$

B. straight line

C. circle with centre at (0, 0) and radius $\sqrt{2}$

D. None of these.

Answer: C

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18. The number of the tangents that can be drawn from (1, 2) to $x^2 + y^2 = 5$ is :

A. 1

B. 2

C. 3

D. 0

Answer: A

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19. The area of the rectangle formed by the perpendiculars from the centre of the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ to the tangent and normal at the point whose eccentric angle is $\frac{\pi}{4}$, is :

A. $\frac{30}{17}$ sq. units

B. $\frac{30}{13}$ sq. units

C. $\frac{27}{17}$ sq. units

D. $\frac{27}{13}$ sq. units.

Answer: B

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20. A ray of light coming along the line $3x + 4y - 5 = 0$ gets reflected from the line $ax + by - 1 = 0$ and goes along the line $5x - 12y - 10 = 0$, then :

A. $a = \frac{64}{115}, b = \frac{112}{15}$

B. $a = \frac{-64}{115}, b = \frac{8}{115}$

C. $a = \frac{64}{115}, b = \frac{8}{115}$

D. $a = \frac{-64}{115}, b = \frac{-8}{115}$.

Answer: C

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21. If P and Q are two points on the circle :

$x^2 + y^2 - 4x - 4y - 1 = 0$, which are farthest and nearest respectively from the point (6, 5), then :

A. $P \equiv \left(\frac{-22}{5}, 3\right)$

B. $Q \equiv \left(\frac{22}{5}, \frac{19}{5}\right)$

C. $P \equiv \left(\frac{14}{3}, \frac{-11}{5}\right)$

D. $Q \equiv \left(\frac{-14}{3}, -4\right)$

Answer: B

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22. A focal chord of $y^2 = 4ax$ meets it in P and Q. If S is the focus, then $\frac{1}{SP} + \frac{1}{SQ} =$

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

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

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

D. None of these.

Answer: A

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23. The eccentric angles of the extremities of latus-rectum to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ are given by :

A. $\tan^{-1}\left(\pm\frac{ae}{b}\right)$

B. $\tan^{-1}\left(\pm\frac{be}{a}\right)$

C. $\tan^{-1}\left(\pm\frac{b}{ae}\right)$

D. $\tan^{-1}\left(\pm\frac{a}{be}\right)$

Answer: C

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24. The equation of the common tangent of the curves $x^2 + 4y^2 = 8$ and $y^2 = 4x$ is :

A. $x - 2y - 4 = 0$

B. $x - 2y + 4 = 0$

C. $2x + y = 4$

D. $2x - y + 4 = 0$

Answer: B

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25. Tangent at any point 'P' of the ellipse $9x^2 + 16y^2 - 144 = 0$ is drawn. Eccentric angle of 'P' is $= \frac{1}{2}\sin^{-1}\left(\frac{1}{7}\right)$. If 'N' is the foot of perpendicular from the centre O to this tangent, then $\angle PON$ is :

A. $\tan^{-1}\left(\frac{1}{12}\right)$

B. $\tan^{-1}\left(\frac{1}{24}\right)$

C. $\frac{\pi}{12}$

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

Answer: B

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