MATHS

BOOKS - IPUCET PREVIOUS YEAR PAPERS MATHS (HINGLISH)

GGSIPU MATHMATICS 2013

Mcqs

1. Concentric circle of radii 1,2,3,.....,100 cms are drawn. The interior of smallest circle is colored red and the angular regions are colored alternately green and red , so that no two adjacent regions are of same color. The total area of green regions in sq. cm. is equals to :

A. 1000π

B. 5050π

C. 4950π

D. 5151π

Answer:

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2. The value of a for which the quadratic equation

$3x^2 + 2a^2 + 1x + a^2 - 3a + 2 = 0$

Possesses roots of opposite signs lies in

A. $(-\infty, 1)$

B. $(-\infty, 0)$

C. $(1, 2)$

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

Answer: C

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3. If $2z_1 - 3z_2 + z_3 = 0$, then z_1, z_2 and z_3 are represented by

A. three of a triangle

B. three collinear points

C. three vertices of a rhombus

D. None of the above

Answer:

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4. The term independent of x in the expansion of $\left(1 + 2x + \frac{2}{x}\right)^3$ is

A. 35

B. 30

C. 32

D. 31

Answer:

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5. The number of six-digit numbers which have sum of their digits as an odd integer, is

A. 45000

B. 450000

C. 97000

D. 970000

Answer:

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6. Consider triangle AOB in the $x-y$ plane, where $A \equiv (1, 0, 0), B \equiv (0, 2, 0) and O \equiv (0, 0, 0)$. The new position of O, when triangle is rotated about side AB by 90^0 can be a. $\left(\frac{4}{5}, \frac{3}{5}, \frac{2}{\sqrt{5}}\right)$

b. $\left(\frac{-3}{5}, \frac{\sqrt{2}}{5}, \frac{2}{\sqrt{5}}\right)$ c. $\left(\frac{4}{5}, \frac{2}{5}, \frac{2}{\sqrt{5}}\right)$ d. $\left(\frac{4}{5}, \frac{2}{5}, \frac{1}{\sqrt{5}}\right)$

A. $\left(\frac{4}{5}, \frac{3}{5}, \frac{2}{\sqrt{5}}\right)$

B. $\left(-\frac{3}{5}, \frac{\sqrt{2}}{5}, \frac{2}{\sqrt{5}}\right)$

C. $\left(\frac{4}{5}, \frac{2}{5}, \frac{2}{\sqrt{5}}\right)$

D. $\left(\frac{4}{5}, \frac{2}{5}, \frac{1}{\sqrt{5}}\right)$

Answer:

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7. How many lines can be drawn which are perpendicular to a given line and pass through a given point lying (i) outside it? (ii) on it?

A. 0

B. 2

C. 4

D. infinite

Answer:

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8. If A and B are two independent events, then which of the following is not equal to any of the remaining?

A. $P\left(A'\bigcap B'\right) - P\left(A\bigcap B\right)$

B. $PA' + PB', \; - 1$

C. $PB - PA'$

D. $PB' - PA$

Answer:

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9. If $U_n = 2\cos n\theta$, then $U_1 U_n - U_{n-1}$ is equal to -

A. u_{n-2}

B. u_{n+1}

C. 0

D. None of these

Answer:

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10. If $\frac{1}{\sqrt{2}} < x < 1$, then prove that $\cos^{-1} x + \cos^{-1}\left(\frac{x + \sqrt{1 - x^2}}{\sqrt{2}}\right) = \frac{\pi}{4}$

A. $2\cos x^{-1}$

B. $2\cos^{-1} x$

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

D. 0

Answer:

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11. The number of values of θ satisfying $4\cos\theta + 3\sin\theta = 5$ as well as $3\cos\theta + 4\sin\theta = 5$ is

A. 1

B. 2

C. 0

D. None of these

Answer:

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12. A kite is flying with the string inclined at 75° to the horizon. If the length of the string is 25 m, the height of the kite is

A. $\left(\frac{25}{2}\right)(\sqrt{3}-1^2)$

B. $\left(\frac{25}{2}\right)(\sqrt{3}+1^2)$

C. $\left(\frac{25}{2}\right)(\sqrt{3}+1^2)$

D. $\left(\frac{25}{2}\right)(\sqrt{6}+\sqrt{2})$

Answer:

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13. The ends of a quadrant of a circle have the coordinates (1, 3) and (3, 1). Then the center of such a circle is (2, 2) (b) (1, 1) (c) (4, 4) (d) (2, 6)

A. $2, 2$

B. $1, 1$

C. $4, 4$

D. $2, 6$

Answer:

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14. If the latus rectum of the parabola $2x^2 - ky + 2 = 0$ be 2, then the vertex is

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

B. $\left(0, \frac{1}{2}\right)$

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

D. $0, 0$

Answer: B

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15. If $f:(3, 4) \rightarrow (0, 1)$ defined by $f(x) = x - [x]$ where [x] denotes the greatest integer function then f (x) is

A. $\frac{1}{x - |x|}$

B. $[x] - x$

C. $x - 3$

D. $x + 3$

Answer:

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16. If $f(x) = \cos^{-1}\left[\frac{x - x^{-1}}{x + x^{-1}}\right]$ then $f'(-2)$ is

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

B. $\frac{-2}{5}$

C. $\frac{-1}{5}$

D. None of these

Answer:

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17. Let f(x) be and even function in R. If f(x) is monotonically increasing in [2, 6], then

A. $f3 > f(-5)$

B. $f-2 < f2$

C. $f(-2) > fe2$

D. $f(-3) < f(5)$

Answer:

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18. If $f(x+2) = \frac{1}{2}\left\{f(x+1) + \frac{4}{f(x)}\right\}$ and $f(x > 0,$ for all $x \in R$,then $\lim_{x \to \infty} f(x)$ is

A. 1

B. 2

C. -2

D. 0

Answer:

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19. $\int \frac{3+2\cos x}{(2+3\cos x)^2}.\,dx$ is equal to

A. $\left(\frac{\sin x}{2+3\cos x}\right)+c$

B. $\left(\frac{\sin x}{2+3\sin x}\right)+c$

C. Both a and b

D. None of the above

Answer:

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20. Differential equation of the family of circles touching the line $y = 2$ at

$(0, 2)$ is (a)

$(b)(c)(d)x^{(e)2(f)}(g) + (h)(i)((j)(k)y - 2(l))^{(m)2(n)}(o) + (p)\frac{(q)dy}{r}((s)$

(z) (aa) *[Math Processing Error]* (uu) (vv)

$(ww)(\times)(yy)x^{(zz)2(aaa)}(bbb) + (ccc)(ddd)((eee)(fff)y - 2(ggg))^{(hhh)2}$

$- 2(vvv)\Big) = 0(www)$

(xxx) (yyy) None of these

A. $x^2 + y - 2^2 + \frac{dy}{dx}w = 2 = 0$

B. $x^2 + y^2\left(2 - 2x\frac{dx}{dy} - y\right) = 0$

C. $x^2 + y - 2^2 + \left(\frac{dx}{dy} + y - 2\right)(y - 2 = 0)$

D. None of the above

Answer:

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21. If a, b, c are non-zero real numbers and the equation $ax^2 + bx + c + i = 0$ has purely imaginary roots, then

A. bc

B. b^2c

C. $-b^2c$

D. $\frac{1}{2}b^2c$

Answer:

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22. If $\vec{a}, \vec{b}, and \vec{c}$ are three mutually orthogonal unit vectors, then the triple product $\left[\vec{a} + \vec{b} + \vec{c}\,\vec{a} + \vec{b}\,\vec{b} + \vec{c}\right]$ equals 0 b. 1 or -1 c. 1 d. 3

A. 0

B. 1

C. -1

D. 3

Answer:

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23. $y^2 = 4x$ is a curve and P, Q and r are three points on it, where P = 1,2, Q = (1/4, 1) and the tangent to the curve at R is parallel to the chord PQ of the curve, then coordinates of R are

A. $\left(\frac{5}{8}, \frac{\sqrt{5}}{2}\right)$

B. $\left(\frac{9}{16}, \frac{3}{2}\right)$

C. $\left(\frac{5}{8}, -\frac{\sqrt{5}}{2}\right)$

D. $\left(\frac{9}{16}, \frac{-3}{2}\right)$

Answer: B

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24. A batsman can score $0, 1, 2, 3, 4$ or 6 runs from a ball. The number of different sequences in which he can score exactly 30 runs in an over of six balls

A. 4

B. 72

C. 56

D. 7

Answer:

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25. The number of solutions for the equation $2\sin^{-1}\left(\sqrt{x^2-x+1}\right)+\cos^{-1}\left(\sqrt{x^2-x}\right)=\frac{3\pi}{2}$ is

A. 1

B. 2

C. 3

D. infinite

Answer: B

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26. The number of solutions of the equation $\int_{-2}^{x} \cos \text{x} \; dx = 0, 0 < x < \frac{\pi}{2}$ is

A. 0

B. 1

C. 2

D. 4

Answer:

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27. A person standing on the bank of a river observes that the angle subtended by a tree on the opposite of bank is 60°. When he retires 40 m.from the bank, he finds the angle to be 30°. What is the breadth of the river ?

A. 40 m

B. 60 m

C. 20 m

D. 30 m

Answer:

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28. Two circles $x^2 + y^2 - 2kx = 0$ and $x^2 + y^2 - 4x + 8y + 16 = 0$ touch each other externally.Then k is

A. 4

B. 1

C. 2

D. -4

Answer:

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29. If the line $ax+by=2$ is a normal to the circle $x^2+y^2-4x-4y=0$ and a tangent to the circle $x^2+y^2=1$, then $a=\frac{1}{2}, b=\frac{1}{2}$ $a=\frac{1+\sqrt{7}}{2}$, $b=\frac{1+\sqrt{7}}{2}$ $a=\frac{1}{4}, b=\frac{3}{4}$ (d) $a=1, b=\sqrt{3}$

A. $a=\frac{1}{2}, b=\frac{1}{2}$

B. $a=\frac{1+\sqrt{7}}{2}, b=\frac{1-\sqrt{7}}{2}$

C. $a=\frac{1}{4}, b=\frac{3}{4}$

D. a = 1, $b=\bar{3}$

Answer:

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30. The graph of the curve $x^2 + y^2 - 2xy - 8x - 8y + 32 = 0$ falls wholly in the first quadrant (b) second quadrant third quadrant (d) none of these

A. first quadrant

B. second quadrant

C. third quadrant

D. None of these

Answer:

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31. The slope of the tangent to the curve $\tan y = \dfrac{(\sqrt{1+x}) - (\sqrt{1-x})}{\sqrt{1+x} + (\sqrt{1-x})}$ at $x = \dfrac{1}{2}$ is

A. $2 - \sqrt{3}$

B. $\sqrt{3}$

C. 1

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

Answer:

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32. The value of $\int_0^{\frac{\pi}{4}} \dfrac{\sec x}{(\sec x + \tan x)^2}.\, dx$ is

A. $1 + \sqrt{2}$

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

C. $-\sqrt{2}$

D. None of these

Answer:

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33. $\lim_{x \to 0} \left\{(1+x)^{\frac{2}{x}}\right\}$ (where {x} denotes the fractional part of x) is equal to.

A. $e^2 - 7$

B. $e^2 - 8$

C. $e^2 - 6$

D. None of these

Answer:

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34. $\int \frac{1}{x^2(x^4+1)^{3/4}} dx =$

A. $\left(1+\frac{1}{x^4}\right)^{\frac{1}{4}} + C$

B. $(x^4+1)^{\frac{1}{4}} + C$

C. $\left(1-\frac{1}{x^4}\right)^{\frac{1}{4}} + C$

D. $-\left(1+\frac{1}{x^4}\right)^{\frac{1}{4}} + C$

Answer:

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35. The solution of the differential equation $(1+x^2y^2)ydx + (x^2y^2-1)xdy = 0$ is

A. $xy = \frac{\log(x)}{y} + C$

B. $xy = 2\frac{\log(y)}{x} + C$

C. $x^2y^2 = 2\frac{\log(y)}{x} + C$

D. None of these

Answer:

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36. the equation of the chord of contact of the pair of tangents drawn to the ellipse $4x^2 + 9y^2 = 36$ from the point (m, n) where $m\dot{n} = m + n, m, n$ being nonzero positive integers, is $2x + 9y = 18$ (b) $2x + 2y = 1$ $4x + 9y = 18$ (d) none of these

A. $2x + 9y = 18$

B. $2x + 2y = 1$

C. $4x + 9y = 18$

D. None of these

Answer:

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37. The equation to the hyperbola of given transverse axis whose vertex bisects the distance between the centre and focus, is given by

A. $3x^2 - y^2 = 3a^2$

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

C. $x^2 - y^2 = 3a^2$

D. None of these

Answer: A

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38. The plane $ax - by + cz = d$ will contains the line $\frac{x-a}{a} = \frac{y+3d}{b} = \frac{z-c}{c}$, provided

A. $b = [0, 3d]$

B. $a = [2d]$

C. $c = [3d]$

D. $b = [-3d]$

Answer:

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39. If z is a complex number lying in the first quadrant such that $\text{Re}(z) + \text{Im}(z) = 3$, then the maximum value of $\{\text{Re}(z)\}^2 \text{Im}(z)$, is

A. 1

B. 2

C. 3

D. 4

Answer:

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40. If A=$\tan^{-1}\left(\frac{x\sqrt{3}}{2k-x}\right)$ and B=$\tan^{-1}\left(\frac{2x-k}{k\sqrt{3}}\right)$ Then, $A - B$ is equal to

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

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

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

D. None of these

Answer:

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41. If in a $\Delta ABC, \angle B = \frac{2\pi}{3}$, then the cos A + cos C lies in

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

B. $\left(-\sqrt{3}, \sqrt{3}\right)$

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

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

Answer:

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