MATHS

BOOKS - JEE MAINS PREVIOUS YEAR ENGLISH

JEE MAINS

Maths

1. Find the area enclosed by the curves `x^2=y , y=x+2,

A. $4\left(\frac{4}{24}\right)^{1/3}$

B. $4\left(\frac{2}{25}\right)^{1/3}$

C. $2\left(\frac{4}{25}\right)^{1/3}$

D. $2\left(\frac{2}{25}\right)^{1/3}$

Answer: A

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2. Find the mean of 43, 51, 50, 57 and 54.

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

B. $\frac{10}{\sqrt{2}}$

C. $\frac{10}{3}$

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

Answer: A

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3. Show that the height of the cylinder of maximum volume that can be inscribed in a sphere of radius R is $\frac{2R}{\sqrt{3}}$.

A. $\sqrt{3}$

B. $2\sqrt{3}$

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

D. $3\sqrt{2}$

Answer: B

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4. Using integration, find the area of the triangle formed by positive x-axis and tangent and normal to the circle $x^2 + y^2 = 4$ at $\left(1, \sqrt{3}\right)$.

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

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

C. $\frac{8}{\sqrt{3}}$

D. $\frac{5}{\sqrt{3}}$

Answer: B

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5. if $f(x) = \begin{cases} \sin x & x < 0 \\ \cos x - |s-1| & x \geq 0 \end{cases}$

then g(g) = f(|x|)is non - differentiable for

A. $\{5, 10, 15\}$

B. $\{5, 10, 15, 20\}$

C. $\{10\}$

D. $\{5, 15\}$

Answer: A

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6. Find area bounded by the curves $x^2 \leq y \leq x + 2$

A. $\frac{11}{2}$

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

C. $\frac{9}{2}$

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

Answer: C

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7. In the expansion at $\left(\frac{2}{x}+x^{\log_e x}\right)^6$ if $T_4 = 20 \times 8^7$ then value of x is

A. $8^{\frac{1}{2}}$

B. 8^2

C. 8^3

D. 8^4

Answer: B

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8. If one root fo the quadratic equation $ix^2 - 2(i+1)x + (2-i) = 0, i = \sqrt{-1}$ is $2-i$, the other root is

A. $p^2 - 4q + 12 = 0$

B. p^(2)-4q-12=0`

C. $q^2 - 4q + 12 = 0$

D. $q^2 - 4q - 12 = 0$

Answer: B

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9. If α, β are the roots of $x^2 + x + 1 = 0$ then

$$\begin{vmatrix} Y+1 & \beta & \alpha \\ \beta & y+\alpha & 1 \\ \alpha & 1 & y+\beta \end{vmatrix}$$

A. $y^2 - 1$

B. $y\left(y^2 - 1\right)$

C. $u^2 - y$

D. y^3

Answer: D

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10. One end point of a focal chrod of a parabola $y^2 = 16x$ is $(1, 4)$. The length of focal chord is : (A)24 (B)25 (C)20 (D)=22

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11. Find the negation of $p \vee (-p \wedge q)$

A. $-p \tilde{} q$

B. $\sim p \tilde{} q$

C. p~q

D. p^q

Answer: A

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12. A curve $f(x) = x^3 + ax - b$ pass through $p(1, -5)$ and tangent to $f(x)$ at point p is perpendicular to $x - y + 5 = 0$ then which of the following point will lie on curve ? A(2,-2) B(2,-1) C(2,1) D(-2,2)

A. $(2 - 2)$

B. $(2 - 1)$

C. $2, -1)$

D. $(-2, 2)$

Answer: D

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13. There are two family each having two children. If there are at least two girls among the children, find the probability that all children are girls

A. $\frac{1}{9}$

B. $\frac{1}{10}$

C. $\frac{1}{11}$

D. $\frac{1}{12}$

Answer: C

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14.

If $\int \frac{dx}{(x^2-2x+10)^2} = A\left(\tan^{-1}\left(\frac{x-1}{3}\right) + \frac{f(x)}{x^2-2x+10}\right) + C$

,where, C is a constant of integration, then

A. $A = \frac{1}{54}, f(x) = 3(x-1)$

B. $A = \frac{1}{54}, f(x) = 9(x-1)^2$

C. $A = \frac{1}{27}, f(x) = 9(x-1)^2$

D. $A = \frac{1}{81}, f(x) = 3(x-1)$

Answer: A

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15. A $(3, 0, -1), B(2, 10, 6)$ and $(1, 2, 1)$ are the vertices of a triangle. M is the mid point of the line segment joining AC and G

is a point on line segment BM dividing $2:1$ ratio internally find $\cos(\angle GOA)$

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

B. $\frac{1}{\sqrt{15}}$

C. $\frac{1}{\sqrt{10}}$

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

Answer: B

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16. Given a point $P(0, -1, -3)$ and the image of P in the plane $3 - y + 4z - 2 = 0$ is Q. Point R is $(3, -1, -2)$ find the area of $\triangle PQR$

A. $\frac{\sqrt{91}}{13}$

B. $\frac{\sqrt{91}}{2}$

C. $\sqrt{\frac{91}{2}}$

D. $\sqrt{91}$

Answer: B

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17. if $\frac{2\sqrt{\sin^2 x - 2\sin x + 5}}{4^{\sin^2 y}} \leq 1$ then which option is correct.

A. $2\sin x = \sin y$

B. $|\sin x| = \sin y$

C. $\sin x = |\sin y|$

D. $\sin x = 2\sin y$

Answer: C

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18. Let $g(x)$ be the inverse of an invertible function $f(x)$ which is differentiable at $x = c$. Then $g'(f(x))$ equal. $f'(c)$ (b) $\frac{1}{f'(c)}$ (c) $f(c)$ (d) none of these

A. g(x) is not differentiable at $x = c$

B. for g(x) to be differentiable at c, $f'(c) = 0$

C. for g(x) to be non-differentiable at c, $f'(c) = 0$

D. none of these

Answer: B

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19. if $\int_0^{f(x)} 4x^3 dx = g(x)(x-2)$ if $f(2) = 6$ and $f'(2) = \frac{1}{48}$ then find $\lim_{x \to 2} g(x)$

A. 18

B. 17

C. 20

D. 19

Answer: A

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20. If $[-\sin\theta]y = 0$ and $[\cot\theta]x + y = 0$ where $[]$ denotes greatest integar function. Then which of the following is correct

A. Infinite solution is $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and a unique solution in $\left(\pi, \frac{7\pi}{6}\right)$

B. Unique solution in $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and infinite solutions in $\left(\pi, \frac{7\pi}{6}\right)$

C. Unique solution is $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and unique solution in $\left(\pi, \frac{7\pi}{6}\right)$

D. Infinite solution in $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and infinite solutions in $\left(\pi, \frac{7\pi}{6}\right)$

Answer: C

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21. $\lim_{x \to 0} \frac{x + 2\sin x}{\sqrt{x^2 + 2\sin x + 1} - \sqrt{\sin^2 x - x + 1}}$

A. 2

B. 1

C. 6

D. -2

Answer: C

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22. If $A \cap B \subseteq C$ and $A \cap B \neq \phi$. Then which of the following is incorrect (1) (A∪B)∩C ≠ϕ (2) B∩C=ϕ (3) A∩C≠ϕ (4) If (A−B)⊆C, then A⊆C

A. $(A \cup B) \cap C \not\subset \phi$

B. $B \cup C = \phi$

C. $A \cup C \not\subset \phi$

D. If $(A - B) \subseteq C$, then $A \subseteq C$

Answer: B

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23. Let $f(x) = 5 - [x - 2]$

$g(x) = [x + 1] + 3$

If maximum value of $f(x)$ is α

& minimum value of $f(x)$ is β

then $\lim_{x \to (\alpha - \beta)} \frac{(x-3)(x^2-5x+6)}{(x-1)(x^2-6x+8)}$ is (A) -1/2 (B)1/2 (C)3/2 (D)-3/2

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

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

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

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

Answer: A

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24. If $\begin{vmatrix} 1+\cos^2\theta & \sin^2\theta & 4\cos 6\theta \\ \cos^2\theta & 1+\sin^2\theta & 4\cos 6\theta \\ \cos^2\theta & \sin^2\theta & 1+4\cos 6\theta \end{vmatrix} = 0,$ and $\theta \in \left(0, \frac{\pi}{3}\right)$, then value of θ is

A. $\frac{7\pi}{36}$

B. $\frac{7\pi}{24}$

C. $\frac{\pi}{9}$

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

Answer: C

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25. A circle touches $x-$ axis at point $(3, 0)$. If it makes an intercept of 8 units on $y-$ axis, then the circle passes through which point A(3,1) B(5,2) C(10,3) D(3,10)

A. $(3, 1)$

B. $(5, 2)$

C. $(10, 3)$

D. $(3, 10)$

Answer: D

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26. The sum of the squares of the length of the chords intercepted on the circle $x^2 + y^2 = 16$, by the lines x +y = n ,

$n \in N$, where N is the set of all natural numbers, is

A. 160

B. 320

C. 105

D. 210

A. 320

B. 105

C. 160

D. 210

Answer: D

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27. Let A and B be two non-null events such that $A \subseteq B$. Then, which of the following statements is always correct? (1) (P(A/B)=P(B)−P(A) (2) P(A/B)>P(A) (3) P(A/B)≤P(A) (4) P(A/B)=1

A. $p(A/B) = p(B) - P(A)$

B. $P(A/B) > P(A)$

C. $P(A/B) \leq P(A)$

D. $P(A/B) = 1$

Answer: C

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28. If α and β be the roots of the equation $x^2 - 2x + 2 = 0$, then the least value of n for which $\left(\frac{\alpha}{\beta}\right)^n = 1$ is:

A. 2

B. 5

C. 4

D. 3

Answer: C

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29. The area (in sq. units) of the region $A = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid 0 \leq x \leq 3, 0 \leq y \leq 4, y \leq x^2 + 3x\}$ is:

A. $\frac{53}{6}$

B. 8

C. $\frac{59}{6}$

D. $\frac{26}{3}$

Answer: C

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30. Let S_1 is set of minima and S_2 is set of maxima for the curve $y = 9x^4 + 12x^3 - 36x^2 - 25$ then (A) $S_1 = \{-2, -1\}, S_2 = \{0\}$ (B) $S_1\{-2, 1\}, S_2 = \{0\}$ (C) $S_1 = \{-2, 1\} : S_2 = \{-1\}$ (D) $S_1 = \{-2, 2\}, S_2 = \{0\}$

A. $S_1 = (-2), S_2 = (0.1)$

B. $S_1 = (-2, 0), S_2 = (1)$

C. $S_1 = (-2, 1), S_2 = (0)$

D. $S_1 = (-1), S_2 = (0, 2)$

Answer: C

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31. If $\alpha = \cos^{-1}\left(\frac{3}{5}\right), \beta = \tan^{-1}\left(\frac{1}{3}\right)$, where $0 < \alpha, \beta < \frac{\pi}{2}$, then $\alpha - \beta$ is equa to :

A. $\tan^{-1}\left(\frac{p}{5\sqrt{10}}\right)$

B. $\cos^{-1}\left(\frac{9}{5\sqrt{10}}\right)$

C. $\tan^{-1}\left(\frac{9}{13}\right)$

D. $\sin^{-1}\left(\frac{9}{5\sqrt{10}}\right)$

Answer: B

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32. let $2..^{20}C_0 + 5.^{20}C_1 + 8.^{20}C_2 + ?. + 62.^{20}C_{20}$. Then sum of this series is

A. 2^{26}

B. 2^{25}

C. 2^{23}

D. 2^{24}

Answer: C

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33. if $|\sqrt{x} - 2| + \sqrt{x}(\sqrt{x} - 4) + 2 = 0$ then find the sum of roots of equation (A) 12 (B) 8 (C) 4 (D) 10

A. 9

B. 12

C. 4

D. 10

Answer: C

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34. if the tangents on the ellipse $4x^2 + y^2 = 8$ at the points (1,2) and (a,b) are perpendicular to each other then a^2 is equal to

A. $\frac{128}{17}$

B. $\frac{64}{17}$

C. $\frac{4}{17}$

D. $\frac{2}{17}$

Answer: C

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35. The value of the integral $\int_0^1 x \cot^{-1}\left(1 - x^2 + x^4\right) dx$ is

A. $\frac{\pi}{2} - \frac{1}{2}\log_e 2$

B. $\frac{\pi}{4} - \log_e 2$

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

D. $\frac{\pi}{4} - \frac{1}{2}\log_e 2$

Answer: A

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36. let P be the plane, which contains the line of intersection of the planes $x + y + z - 6 = 0$ and $2x + 3y + z + 5 = 0$ and it is perpendicular to the xy-plane thent he distance of the point (0,0,256) from P is equal to

A. $17/\sqrt{5}$

B. $63\sqrt{5}$

C. $205\sqrt{5}$

D. $11/\sqrt{5}$

Answer: A

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37. If the lines $x + (a-1)y = 1$ and $2x + 1a^2y = 1$ there $a \in R - \{0, 1\}$ are perpendicular to each other, Then distance of

their point of intersection from the origin is

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

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

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

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

Answer: A

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38. The point lying on common tangent to the circles $x^2 + y^2 = 4$ and $x^2 + y^2 + 6x + 8y - 24 = 0$ is (1) (4,-2) (2) (-6,4) (3) (6,-2) (4) (-4,6)

A. (4,-2)

B. (-6,4)

C. (6,-2)

D. (-4,6)

Answer: D

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39. The mean and median of $10, 22, 26, 29, 34, x, 42, 67, 70, y$ (in increasing order) are 42 and 35 respectively then the value of $\frac{y}{x}$ is (A)9/4 (B)7/2 (C)8/3 (D)7/3

A. $9/4$

B. $7/2$

C. $8/3$

D. $7/3$

Answer: A

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40. If $y(x)$ satisfies the differential equation cosx $\frac{dy}{dx} - y$ sinx $= 6x$. And $y\left(\frac{\pi}{3}\right) = 0$. Then value of $y\left(\frac{\pi}{6}\right)$ is (A) $\frac{\pi^2}{2\sqrt{3}}$ (B) $-\frac{\pi^2}{2}$ (C) $-\frac{\pi^2}{2\sqrt{3}}$ (D) $-\frac{\pi^2}{4\sqrt{3}}$

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

B. $-\frac{\pi^2}{2}$

C. $-\frac{\pi^2}{2\sqrt{3}}$

D. $-\frac{\pi^2}{4\sqrt{3}}$

Answer: A

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41. The domain of $f(x) = \frac{3}{4 - x^2} + \log_{10}(x^3 - x)$ (1) $(-1, 0) \cup (1, 2) \cup (3, \infty)$ (2) $(-2, -1) \cup (-1, 0) \cup (2, \infty)$ (3) $(-1, 0) \cup (1, 2) \cup (2, \infty)$ (4) $(1, 2) \cup (2, \infty)$

A. $(-1, 0) \cup (1, 2) \cup (3, \infty)$

B. $(-2, -1) \cup (-1, 0) \cup (2, \infty)$

C. $(-1, 0) \cup (1, 2) \cup (2, \infty)$

D. $(1, 2) \cup (2, \infty)$

Answer: C

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42. If the sum of first 3 terms of an $A.P.$ is 33 and their product is 1155. Then the 11^{th} term of the $A.P.$ Is

A. -35

B. 25

C. 36

D. -25

Answer: B

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43. Find the equations of the tangents to the ellipse $3x^2 + 4^2 = 12$ which are perpendicular to the line $y + 2x = 4$.

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

B. $\frac{\sqrt{61}}{2}$

C. $\frac{\sqrt{221}}{2}$

D. $\frac{\sqrt{157}}{2}$

Answer: A

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44. Consider $f(x) = x\sqrt{kx - x^2}$ for $x\varepsilon[0, 3]$. Let m be the smallest value of k for which the function is increasing in the given interval and M be the largest value of $f(x)f$ or $k = m. Then$(m,M)` is

A. $(4, 3\sqrt{2})$

B. $(4, 3\sqrt{3})$

C. $(3, 3\sqrt{3})$

D. $(5, 3\sqrt{6})$

Answer: C

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45. Let S_n denote the sum of the first n terms of an $A.P.$. If $S_4 = 16$ and $S_6 = -48$, then S_{10} is equal to :

A. -260

B. -410

C. -320

D. -380

Answer: C

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46. If the volume of parallelopiped formed by the vectors $\hat{i} + \lambda\hat{j} + \hat{k}$, $\hat{j} + \lambda\hat{k}$ and $\lambda\hat{i} + \hat{k}$ is minimum then λ is equal to (1) $-\frac{1}{\sqrt{3}}$ (2) $\frac{1}{\sqrt{3}}$ (3) $\sqrt{3}$ (4) $-\sqrt{3}$

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

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

C. $\sqrt{3}$

D. $-\sqrt{3}$

Answer: A

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47. If the line $\frac{x-2}{3}=\frac{y+1}{2}=\frac{z-1}{-1}$ intersects the plane $2x+3y-z+13=0$ at a point P and plane $3x+y+4z=16$ at a point Q then PQ is equal to (A) 14 (B) $\sqrt{14}$ (C) $2\sqrt{7}$ (D) $2\sqrt{14}$

A. 14

B. $\sqrt{14}$

C. $2\sqrt{7}$

D. $2\sqrt{14}$

Answer: C

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48. The derivative of $\tan^{-1}\left(\frac{\sin x - \cos x}{\sin x + \cos x}\right)$, with respect to $\frac{x}{2}$, where $x \in \left(0, \frac{\pi}{2}\right)$ is:

A. 1

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

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

D. 2

Answer: C

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49. The angle of elevation of the loop of a vertical tower standing on a horizontal plane is observed to be 45° from a point A on the plane. Let B be the point $30m$ vertically above the point A. If the angle of elevation of the top of the tower from B be 30°, then the distance (in m) of the foot of the lower from the point A is:

A. $15\left(3+\sqrt{3}\right)$

B. $15\left(5-\sqrt{3}\right)$

C. $15\left(3-\sqrt{3}\right)$

D. $15\left(1+\sqrt{3}\right)$

Answer: B

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50. If the equation $\cos 2x + \alpha \sin x = 2\alpha - 7$ has a solution. Then range of α is (A) R (B) $[1, 4]$ (C) $[3, 7]$ (D) $[2, 6]$

A. R

B. $[1, 4]$

C. $[3, 7]$

D. $[2, 6]$

Answer: A

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51. A plane which bisects the angle between the two given planes $2x - y + 2z - 4 = 0$ and $x + 2y + 2z - 2 = 0$, passes through the point: (A) $(1, -4, 1)$ (B) $(1, 4, -1)$ (C) $(2, 4, 1)$ (D) $(2, -4, 1)$

A. $(1, -4, 1)$

B. $(1, 4, -1)$

C. $(2, 4, 1)$

D. $(2, -4, 1)$

Answer: A

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Physics

1. A plane electromagnetic wave of frequency $50MHz$ travels in free space along the positive x-direction. At a particular point is space and time, $\overrightarrow{E} = 6.3\hat{j}V/m$. The corresponding magnetic field $\widehat{B}$, at that point wiil be:

A. $18.9 \times 10^{-8} \hat{k} T$

B. $2.1 \times 10^{-8} \hat{k} T$

C. $6.3 \times 10^{-8} \hat{k} T$

D. $18.9 \times 10^{8} \hat{k} T$

Answer:

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2. Three charges +Q, q, +Q are placed respectively, at distance, 0, d//2 and d from the origin, on the x-axis. If the net force experienced by +Q placed at x=0, is zero, then value of q is :

A. $-Q/4$

B. $+Q/2$

C. $Q/4$

D. $-Q/2$

Answer:

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3. A copper wire is stretched to make it 0.5% longer. The percentage change in its electrical resistance if its volume remains unchanged is :

A. 2.0%

B. 2.5%

C. 1.0%

D. 0.5%

Answer:

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4. A sample of radioactive material A, that has an activity of $10mCi\left(1Ci = 3.7 \times 10^{10} decays/s\right)$, has twice the number of nuclei as another sample of a different radioactive material B which has an activity of 20 mCi. The correct choices for half-lives of A and B would then be respectively :

A. 5 days and 10 days

B. 10 days and 40 days

C. 20 days and 5 days

D. 20 days and 10 days

Answer:

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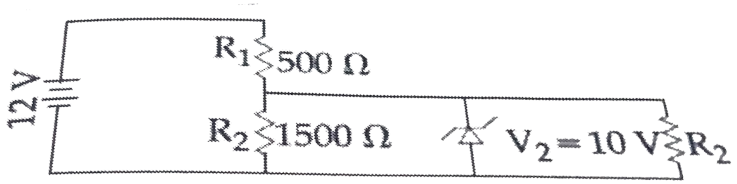
5. In the given circuit the current through Zener Diode is close to :



A. 0.0 mA

B. 6.7 mA

C. 4.0 mA

D. 6.0 mA

Answer:

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6. There are two long co-axial solenoids of same length l. The inner and other coils have redii r_1 and r_2 and number of turns

per unti length n_1 and n_2 respectively .The reatio of mutual inductance to the self - inductance of the inner- coil is : (A) $\frac{n_1}{n_2}$ (B) $\frac{n_2}{n_1}.\frac{r_1}{r_2}$ (C) $\frac{n_2}{n_1}.\frac{r_2^2}{r_1^2}$ (D) $\frac{n_2}{n_1}$

A. $\frac{n_1}{n_2}$

B. $\frac{n_2}{n_1}.\frac{r_1}{r_2}$

C. $\frac{n_2}{n_1}.\frac{r_2^2}{r_1^2}$

D. $\frac{n_2}{n_1}$

Answer:

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7. If the deBroglie wavelenght of an electron is equal to 10^-3 times the wavelenght of a photon of frequency 6×10^{14}Hz ,then the calculate speed of electrone. Speed of light $= 3 \times 10^8 m/s$

Planck's constant $= 6.63 \times 10^{-34}$ J s

Mass of electron $= 9.1 \times 10^{-31}$ kg

A. $1.1 \times 10^{6} m/s$

B. $1.7 \times 10^{6} m/s$

C. $1.8 \times 10^{6} m/s$

D. $1.45 \times 10^{6} m/s$

Answer:

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8. एक प्रगामी आवर्ती तरंग को समीकरण y(x, y) = 10^{-3} sin(50t + 2x) से निरूपित किया जाता है, जहाँ x तथा y मीटर में तथा 1 सेकण्ड में हैं। निम्न में से तरंग के लिए कौनसा कथन सत्य है|

A. the wave is propagating along the negative x-axis with sped $25ms^{-1}$

B. the wave is propagating along the postitive x-axis with speed $100ms^{-1}$

C. the wave is propagating along the postive x-axis with speed $25ms^{-1}$

D. the wave is propagating along the nagative x-axis with speed $100ms^{-1}$

Answer:

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9. AN ideal battery of 4 V and resistance R are connected in series in the primary circuit of a notentiometer of length 1 m and the

value of R, to give a differeence of 56mV across 10 cm of notentiometer wire , is :

A. 490Ω

B. 480Ω

C. 396Ω

D. 495Ω

Answer:

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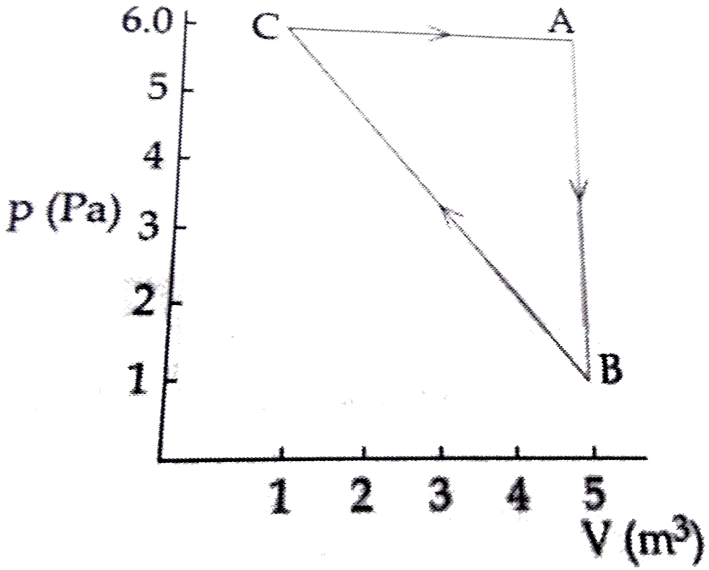
10. for the given cyclic process CAB as shown for a gas , the work done is :



A. 30J

B. 10J

C. 1J

D. 5J

Answer:

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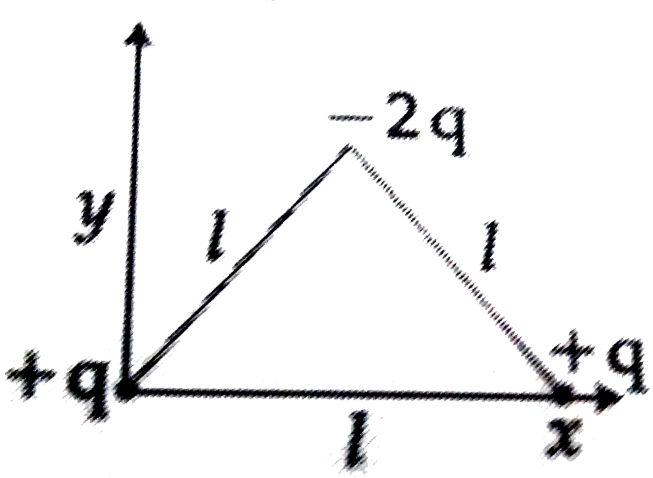
11. Determine the electric dipole moment of the syatem of three charges , placed on the verices of an equilateral triangle , as shown in the fogure :



A. $\sqrt{3}ql\frac{\hat{j}-\hat{i}}{\sqrt{2}}$

B. $(ql)\frac{\hat{i}+\hat{j}}{\sqrt{2}}$

C. $2ql\hat{j}$

D. $-\sqrt{3}ql\hat{j}$

Answer:

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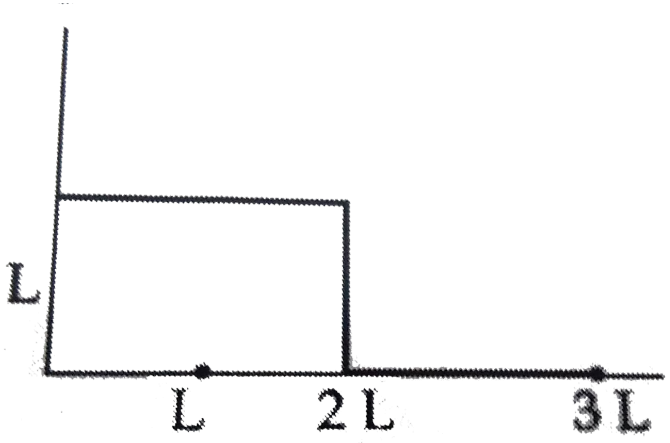
12. the position vector of the centre of mass lt

$\rightarrow$

r cm of an asymmetric uniform bar of negligible area of cross - section as shown in figure is :



A. $\vec{r}_{cm} = \frac{13}{8}L\hat{x} + \frac{5}{8}L\hat{y}$

B. $\vec{r}_{cm} = \frac{5}{8}L\hat{x} + \frac{13}{8}L\hat{y}$

C. $\vec{r}_{cm} = \frac{3}{8}L\hat{x} + \frac{11}{8}L\hat{y}$

D. $\vec{r}_{cm} = \frac{11}{8}L\hat{x} + \frac{3}{8}L\hat{y}$

Answer:

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13. A person standing on an open ground hears the sound of a jet aeroplane , coming from north at an angle 60° with ground level ,But he finds the aeroplane right vertically above his position , if V is the speed of sound , speed of the plane is :

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

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

C. v

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

Answer:

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14. An ideal gas is enclosed in a cylinder at pressure of 2 atm and temperature, 300 K.The men time between two successive collosions is 6×10^{-8} s. If the pressure to $500K$, the mean time between two successive collisions will be close to :

A. $2 \times 10^{-7}s$

B. $4 \times 10^{-8}s$

C. $0.5 \times 10^{-8}s$

D. $3 \times 10^{-6}s$

Answer: A

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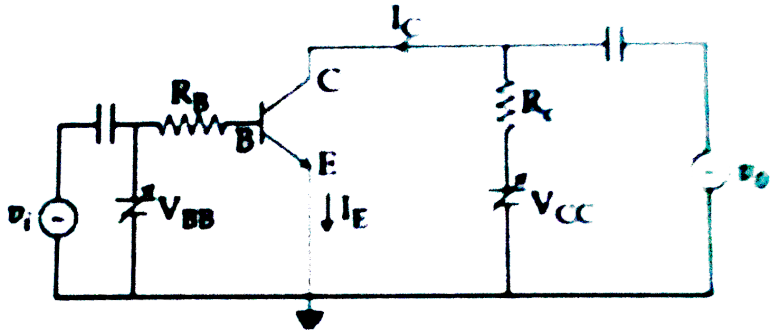
15. 

In the figure, given that V_{BB} supply can vary from 0 to $5.0V$, $V_{\mathbb{C}} = 5V$, $\beta_{dc} = 200$, $R_B = 100K\omega$, $R_C = 1K\omega$ and $V_{BE} = 1.0V$, The minimum base current and the input voltage at which the transistor will go to saturation, will be, respectively:

A. $25\mu A$ and $3.5V$

B. $20\mu A$ and $3.5V$

C. $25\mu A$ and $2.8V$

D. $20\mu A$ and $2.8V$

Answer: A

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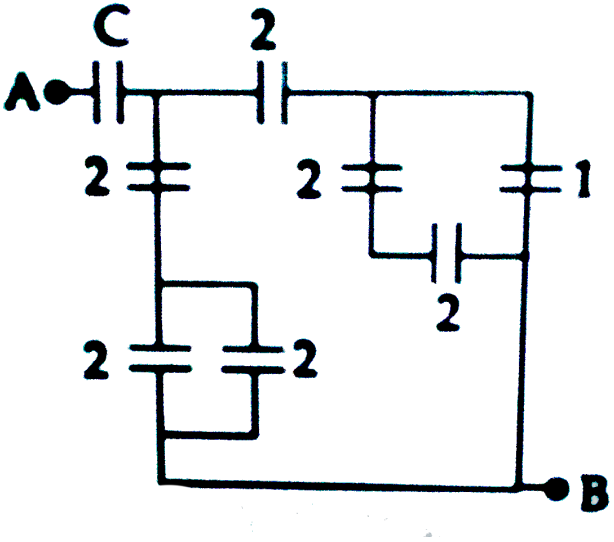
16. In the circuit shown, find C if the effective capacitance of the whole, circuit is to be $0.5\mu F$. All values in the circuit are in μF.



A. $\frac{7}{11}\mu F$

B. $\frac{6}{5}\mu F$

C. $4\mu F$

D. $\frac{7}{10}\mu F$

Answer: A

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17. A 10 m long horizontal wire extends from North east ro South East. It is falling with a speed of $5.0ms^{-1}$, at right angles to the horizontal component of the earth's magnetic field, of $0.3 \times 10^{-4}Wb/m^2$. The value of the induced emf in wire is :

A. $1.5 \times 10^{-3}V$

B. $1.1 \times 10^{-3}V$

C. $2.5 \times 10^{-3}V$

D. $0.3 \times 10^{-3}V$

Answer: A

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18. To double the covering range of a TV transmittion tower, its height should be multiplied by :

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

B. 2

C. 4

D. $\sqrt{2}$

Answer: A

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