JEE-Main-05-04-2024 (Memory Based)
[EVENING SHIFT]

Maths

Question: If S = (2, 4,8.....512) divided in 3 set A, B, C into equal no. of elements the n(AUBUC) is equal to S then AUB=BUC=CUA= ϕ then probability of ABC

Question: The 50th word in the dictionary using the letters B, B, H, J, O is:
Options:
(a) OBBJH
(b) OBBHJ
(c) JHBBO
(d) BBHOJ
Answer: (a)

Question: $\left(\frac{3^{\frac{1}{5}}}{x}+\frac{2x}{5^{\frac{1}{3}}}\right)^{12}$.Find which term is constant.
Options:
(a) 4th
(b) 5th
(c) 6th
(d) 7th
Answer: (d)

Question: $4^{1+x}+4^{1-x}, \frac{k}{2}, 16^{x}+16^{-x}$ Let are in A.P. then least value of k is _____.
Answer: (10)

Question: Let image of point (8, 5, 7) with respect to line $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-2}{5}$ is (α, β, γ). Then, $\alpha+\beta+\gamma$ is equal to
Options:
(a) 10
(b) 12
(c) 9
(d) 14
Answer: (d)

Question: Area bounded by y = -2|x| and y = x|x| is:
Options:
(a) ⅔
(b) ⅓
(c) ½
(d) 4/3
Answer: (d)

Question: The number of real solution x|x + 5| + 2|x + 7| - 2 = 0 is

Options:
(a) 1
(b) 2
(c) 3
(d) 4
Answer: (c)

Question: $A=\begin{bmatrix}\alpha & \alpha & \alpha\\ \beta & \alpha & -\beta\\ -\alpha & \alpha & \alpha\end{bmatrix}.B$. B is formed by cofactor of A, matrix then f out determinant of AB.

Options:
(a) $4\ \alpha^3\ (2\alpha+\beta)^5$
(b) $12\ \alpha^3\ (2\alpha+\beta)^2$
(c) $8\ \alpha^6\ (\alpha+\beta)^3$
(d) $18\ \alpha^8\ (\alpha+\beta)^3$
Answer: (c)

Question: Consider the equation $P(x) = ax^2 + bx + C = 0$. If $a, b, c \in A$ where $A = \{1, 2, 3, 4, 5, 6\}$, then the probability that $P(x)$ has real and distinct roots?

Question: If $f : R \to R$ and $g : R \to R$ defined such that $f(x) = |x| - 1$ and

$g(x)=\begin{cases}e^x, & x>0\\ x-1, & x\le 0\end{cases}$ then,

Options:
(a) Both f and g are one-one
(b) f is one-one and g is many one
(c) f is many-one and g is one-one
(d) Both f and g are many-one
Answer: (c)

Question: A line L is perpendicular to $y = 2x + 10$ such that it touches the parabola $y^2 = 4(x - 9)$. Find distance between point of contact and origin.
Options:
$\sqrt{165}$(a)
$\sqrt{175}$(b)
$\sqrt{185}$(c)
$\sqrt{190}$(d)

Answer: (c)

Question: If S = {2, 3, 8, 16,....,512}. If S is broke in 3 equal subsets A, B and C such than $A \cap B = B \cap C = C \cap A = \phi$ and $A \cup B \cup C = S$, then maximum number of ways to break is:

Options:

(a) ${}^{9}C_{3}$

(b) $\frac{9!}{(3!)^3}$

(c) $\frac{9!}{(3!)^4}$

(d) $\frac{9!}{(3!)^2}$

Answer: (b)

Question: If $\frac{dy}{dx} + y + y \cdot \frac{2x}{(1+x^2)^2} = xe^{\frac{1}{1+x^2}} \cdot y(0) = 0,$ and $f(x) = y(x)e^{-\frac{1}{1+x^2}}$ and y = x.

Then the area bounded b/w these two curve equals to:

Options:

(a) ⅔

(b) ⅓

(c) 7/6

(d) 2

Answer: (a)

Question: If $y = \frac{2\cos 2\theta + \cos\theta}{\cos 3\theta + \cos^2\theta + \cos\theta}$, then the value of y" + y' + y is

Options:

(a) $\sec\theta\,(1 - \tan^3\theta)$

(b) $\tan\theta\ (\sec^3\theta + 2\tan^2\theta)$

(c) $\sec\theta\ (2\sec^2\theta + \tan\theta)$

(d) $\cot\theta\ (\sec^3\theta + 2\tan^2\theta)$

Answer: (c)

Question: If $2x^2 - x + 2 = 0$ and one root is a, then $\lim_{x\to\frac{1}{a}} \frac{16(1-\cos(2x^2-x+2))}{(ax-1)^2}$ equal to

Options:

$\frac{32(1-a^2)^2}{a^4}$ (a)

$\frac{8(1-a^2)^2}{a^3}$ (b)

$\frac{16(1-a^2)^2}{a^4}$ (c)

$\frac{20(1-a^2)^2}{a^3}$ (d)

Answer: (a)

Question: $\beta(m,\ n) = \int_0^1 x^m(1-x^m)^{n-1}dx$ and

$a \times \beta(-b,\ c) = \int_0^1 \left(1-x^{10}\right)^{20}dx$ then (a + b + c) is equal to:

Options:

(a) 210

(b) 230

(c) 250

(d) 270

Answer: (a)

Question: Find the differential equation of circle whose centre lies on y =x and passes through (0, 1)

Options:

$-x^2+y^2-2xy+2x-1+\frac{dy}{dx}$ (a)

$(x^2-y^2-2xy+2y-1)=0$

$-x^2-y^2-2xy+2x-1+\frac{dy}{dx}$ (b)

$(x^2+y^2)=0$

$-x^2-y^2-2xy+2x-1+\frac{dy}{dx}$ (c)

$(x^2-y^2)=0$

$-x^2+y^2-2xy+2x-1+\frac{dy}{dx}$ (d)

$(x^2+y^2-2)=0$

Answer: (a)

Question: $|\vec{a}|=2, |\vec{b}|=3$ and $\vec{a}=\vec{b}\times\vec{c}$, then minimum value of $|\vec{c}-\vec{a}|^2$

Options:

(a) 13

(b) 5

$\frac{40}{9}$ (c)

$\frac{20}{9}$ (d)

Answer: (c)