



JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

12th January 2019 | Shift - I

MATHEMATICS

Q.1 The area enclosed by curves $y = x^2 + 2$, $y = x + 1$, $x = 0$ and $x = 3$ is

- (1) $\frac{15}{2}$ (2) $\frac{13}{2}$ (3) $\frac{11}{2}$ (4) $\frac{5}{2}$

Ans. [1]

Q.2 $\int \cos(\ln x) dx$ is equal to

- (1) $\frac{x}{2} (\cos(\ln x) + \sin(\ln x)) + c$ (2) $\frac{3}{2} (\cos(\ln x) - \sin(\ln x)) + c$
(3) $x(\cos(\ln x) + \sin(\ln x)) + c$ (4) $x(\cos(\ln x) - \sin(\ln x)) + c$

Ans. [1]

Q.3 If $S = \{1, 2, \dots, 100\}$, then number of subsets so that the product of all elements is even, is

- (1) 2^{100} (2) $2^{50}(2^{50} - 1)$ (3) $2^{100} - 1$ (4) $2^{50} - 1$

Ans. [2]

Q.4 A hyperbola whose vertices are $(-2, 0)$ and $(2, 0)$ and focus $(-3, 0)$ then equation of hyperbola is

- (1) $\frac{x^2}{25} - \frac{y^2}{16} = 1$ (2) $\frac{x^2}{16} - \frac{y^2}{25} = 1$ (3) $\frac{x^2}{4} - \frac{y^2}{5} = 1$ (4) $\frac{x^2}{5} - \frac{y^2}{4} = 1$

Ans. [3]

Q.5 Sum of deviation of 50 observations from 30 is 50 then mean of these observations is equal to

- (1) 33 (2) 31 (3) 35 (4) 37

Ans. [2]

Q.6 A fair die is rolled 5 times. An experiment is conducted which terminates when 2 consecutive 4's are obtained. Then the probability that experiment ends in 5th roll is

- (1) $\frac{175}{6^5}$ (2) $\frac{150}{6^5}$ (3) $\frac{125}{6^5}$ (4) $\frac{100}{6^5}$

Ans. [1]

Q.7 If $\frac{z-\alpha}{z+\alpha}$ is purely imaginary and $|z|=82$ then α is ($\alpha \in \mathbb{R}$)

- (1) 2 (2) 4 (3) 3 (4) 1

Ans. [1]

Q.8 $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\cot^3 x - \tan x}{\cos\left(x + \frac{\pi}{4}\right)}$ is equal to

- (1) 8 (2) 4 (3) 2 (4) None

Ans. [1]

Q.9 If $f(x) = \min\{\sin x, \cos x\}$, $x \in (-\pi, \pi)$ and set S contains values of x for which $f(x)$ is not differentiable then S is a subset of

- (1) $\left\{-\frac{\pi}{6}, \frac{\pi}{6}\right\}$ (2) $\left\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{\pi}{6}\right\}$
(3) $\left\{-\frac{\pi}{4}, \frac{\pi}{4}\right\}$ (4) $\left\{-\frac{3\pi}{4}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}\right\}$

Ans. [4]

Q.10 If $f(x)$ and $g(x)$ are continuous in $[0, a]$ and $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$ then $\int_0^a f(x) \cdot g(x) dx$ is equal to

- (1) $4 \int_0^a f(x) dx$ (2) $2 \int_0^a f(x) dx$ (3) $3 \int_0^a f(x) dx$ (4) $\int_0^a f(x) dx$

Ans. [2]

Q.11 If $\tan^{-1}2x + \tan^{-1}3x = \frac{\pi}{4}$ then set of x is

- (1) contains 2 element (2) null set
(3) singleton (4) more than 1 elements

Ans. [3]

Q.12 If three distinct vectors are $\mu\hat{i} + \hat{j} + \hat{k}$, $\hat{i} + \mu\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} + \mu\hat{k}$ lies on same plane, then sum of distinct values of μ is

- (1) -2 (2) 0 (3) -1 (4) 1

Ans. [1]



Q.21 Three numbers are in G.P., their product is 512. If we add 4 to first & second number, then they are in an A.P. then the sum of original 3 numbers is

- (1) 28 (2) 24 (3) 32 (4) 20

Ans. [1]

Q.22 3 boxes 1, 2, 3 each contained 10 balls, labeled 1, 2, ..., 10. Let n_i be label on the ball drawn from box i ($i = 1, 2, 3$) then number of ways $n_1 < n_2 < n_3$ is

- (1) 120 (2) 130 (3) 122 (4) 136

Ans. [1]

Q.23 $(1 + \alpha)x + \beta y + z = 2,$
 $\alpha x + (1 + \beta)y + z = 3$ and
 $\alpha x + \beta y + 2z = 2$

has unique solution (α, β) is

- (1) $(-2, 16)$ (2) $(2, -4)$ (3) $(-8, 6)$ (4) $(-2, 0)$

Ans. [1]

Q.24 Let $y = 12 - x^2$. A rectangle is inscribed in parabola whose base lie on x-axis then maximum area of rectangle is

- (1) 32 (2) 28 (3) 24 (4) 12

Ans. [1]

Q.25 Let $y^2 = 4x$, point $P(4, -4)$, $Q(9, 6)$ & vertex O . A point X is lie between arc POQ . Then maximum area of ΔPQX . Then maximum area of ΔPQX

- (1) $\frac{125}{4}$ (2) $\frac{125}{2}$ (3) $\frac{135}{4}$ (4) $\frac{135}{2}$

Ans. [1]

Q.26 If $P = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 9 & 3 & 1 \end{bmatrix}$, $Q = [a_{ij}]_{3 \times 3}$ and $Q - P^5 = I_3$, then $\frac{a_{21} + a_{31}}{a_{32}}$ is

- (1) 8 (2) 9 (3) 10 (4) 20

Ans. [3]

Q.27 If line perpendicular to line $2x - 3y + \lambda = 0$ pass through $(7, 15)$ & $(15, \beta)$ then β is equal to

- (1) 3 (2) 2 (3) 1 (4) -3

Ans. [1]