



JEE Main Online Exam 2019

Questions & Solutions

10th April 2019 | Shift - II

(Memory Based)

MATHEMATICS

Q.1 $\int x^5 e^{-x^2} dx = g(x)e^{-x^2} + c$, then $g(-1)$ is equal to -

(1) $3/2$

(2) $-3/2$

(3) $-5/2$

(4) $5/2$

Ans. [3]

Q.2 $\int_{\pi/6}^{\pi/3} \sec^{2/3} x \cos ec^{4/3} x dx$ is equal to -

(1) $2\left(3^{1/6} - \frac{1}{3^{1/6}}\right)$

(2) $4\left(3^{1/6} - \frac{1}{3^{1/6}}\right)$

(3) $3\left(3^{1/6} - \frac{1}{3^{1/6}}\right)$

(4) $5\left(3^{1/6} - \frac{1}{3^{1/6}}\right)$

Ans. [3]

Q.3 $\frac{dy}{dx} + y \tan x = 2x + x^2 \tan x$ and $y(0) = 1$, then-

(1) $y\left(\frac{\pi}{4}\right) - y\left(\frac{-\pi}{4}\right) = \sqrt{2}$

(2) $y'\left(\frac{\pi}{4}\right) - y'\left(\frac{-\pi}{4}\right) = \pi - \sqrt{2}$

(3) $y'\left(\frac{\pi}{4}\right) - y'\left(\frac{-\pi}{4}\right) = \pi + \sqrt{2}$

(4) $y'\left(\frac{\pi}{4}\right) - y'\left(\frac{-\pi}{4}\right) = \pi + \sqrt{3}$

Ans. [2]

Q.4 A coin is tossed n times. If the probability of getting atleast one head is more than 99% then minimum value of n is -

(1) 8

(2) 7

(3) 9

(4) 10

Ans. [2]

Q.5 $\lim_{x \rightarrow 1} \frac{x^2 - ax + b}{x - 1} = 5$, then $a + b$ is equals -

(1) $\frac{-1}{2}$

(2) -4

(3) -7

(4) 4

Ans. [3]



Q.6 $5 + |2^x - 1| = 2^x(2^x - 2)$, then no. of real solution is -

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

Ans. [2]

Q.7 $1 + \left(1 + \frac{1^3 + 2^3}{1+2} + \frac{1^3 + 2^3 + 3^3}{1+2+3} + \dots + 15 \text{ terms}\right) - \frac{1}{2}(1 + 2 + 3 + \dots + 15)$ is equal to -

- (1) 620 (2) 260 (3) 60 (4) 602

Ans. [1]

Q.8 Let equation of hyperbola is $16x^2 - 9y^2 = 144$. Then coordinate of focus corresponding to directrix $5x + 9 = 0$ is-

- (1) (-5, 0) (2) (+5, 0) (3) (-3, 0) (4) (+3, 0)

Ans. [1]

Q.9 Locus of centre of circle which touches circle $x^2 + y^2 = 1$ externally and y-axis is -

- (1) $y^2 = 1 + 2x$ (2) $y^2 = 1 + 4x$ (3) $x^2 = 1 + 2y$ (4) $x^2 = 1 - 2y$

Ans. [1]

Q.10 Tangent and Normal at P(2, 2) for ellipse $\frac{3x^2}{32} + \frac{5y^2}{32} = 1$ cuts x-axis at Q and R. Then area of ΔPQR is -

- (1) $\frac{68}{15}$ (2) $\frac{68}{13}$ (3) $\frac{68}{11}$ (4) $\frac{72}{5}$

Ans. [1]

Q.11 Common tangent of curve $y^2 = 4\sqrt{2}x$ and $x^2 + y^2 = 1$ is $ax + y = c$ then $|c|$ is -

- (1) $\sqrt{3}$ (2) $\sqrt{5}$ (3) $\sqrt{2}$ (4) $\sqrt{7}$

Ans. [3]

Q.12 If z and w be two complex number such that $|zw| = 1$ and $\arg z - \arg w = \frac{\pi}{2}$ then

- (1) $\bar{z}w = i$ (2) $\bar{z}w = -i$ (3) $\bar{z}w = \frac{1-i}{2}$ (4) $\bar{z}w = \frac{1+i}{2}$

Ans. [2]

Q.13 If $\cos^{-1}x - \cos^{-1}\frac{y}{2} = \alpha$, then $4x^2 - 4xy \cos \alpha + y^2$ is equal to -

- (1) $2 \sin 2\alpha$ (2) 4 (3) $4 \sin^2 \alpha$ (4) $-4 \sin^2 \alpha$

Ans. [3]



- Q.14** Angles of a triangle are in A.P. and sides $a : b = 1 : \sqrt{3}$ and $c = 4$ then area of triangle is -
(1) $4\sqrt{3}$ (2) $3\sqrt{3}$ (3) $2\sqrt{3}$ (4) $5\sqrt{3}$

Ans. [3]

- Q.15** If the coefficient of x in binomial expression $\left(x^2 + \frac{1}{x^3}\right)^n$ is ${}^nC_{23}$. Then minimum value of n is -
(1) 54 (2) 55 (3) 38 (4) 58

Ans. [3]

- Q.16** If the tangent to the curve $y = \left(\frac{x}{x^2 - 3}\right)$ at $(\alpha, \beta) \neq (0, 0)$ is parallel to $2x + 6y + 11 = 0$ then -
(1) $|6\alpha + 2\beta| = 9$ (2) $|6\alpha + 2\beta| = 19$ (3) $|2\alpha + 6\beta| = 19$ (4) $|2\alpha + 6\beta| = 9$

Ans. [2]

- Q.17** If a, b, c are in G.P. and first three terms of an A.P. are $3a, 7b, 15c$, then the fourth term of A.P.
(1) $\frac{7}{3}a$ (2) a (3) $\frac{5}{3}$ (4)

Ans. [2]

- Q.18** If a_1, a_2, \dots, ∞ are in A.P. and $a_6 = 2$, then value of common difference for which $(a_1 a_4 a_5)_{\max}$
(1) $\frac{6}{5}$ (2) $\frac{4}{5}$ (3) $\frac{8}{5}$ (4) $\frac{7}{5}$

Ans. [3]

- Q.19** A spherical iron ball 10 cm in radius is coated with a layer of ice of uniform thickness that melts at a rate of $50 \text{ cm}^3/\text{min}$. When the thickness of ice is 5 cm, then the rate of which the thickness of ice decreases is -
(1) $\frac{1}{36\pi} \text{ cm/min}$ (2) $\frac{1}{18\pi} \text{ cm/min}$ (3) $\frac{1}{54\pi} \text{ cm/min}$ (4) $\frac{5}{6\pi} \text{ cm/min}$

Ans. [2]

- Q.20** If both standard deviation and mean of observation x_1, x_2, \dots, x_{50} is 16 then mean of $(x_1 - 4)^2 + (x_2 - 4)^2 + \dots + (x_{50} - 4)^2$ is equal to -
(1) 100 (2) 200 (3) 400 (4) 800

Ans. [3]

Q.21 Equation of planes are

$$P_1 : 2x - y + 2z + 3 = 0$$

$$P_2 : 4x - 2y + 4z + \lambda = 0$$

$$\text{and } P_3 : 2x - y + 2z + \mu = 0$$

distance between P_1 & P_2 is $\frac{1}{3}$ and P_1 & P_3 is $\frac{2}{3}$, then maximum value of $\lambda + \mu$ is -

- (1) 10 (2) 13 (3) 6 (4) 7

Ans. [2]

Q.22 Area bounded by the curves $y = |x + 1|$, $y = 2^x$ in the Ist quadrant is -

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

Ans. [4]

Q.23 There are 20 pillars of equal height on the circumference of a circle. If any two non adjacent pillars are joined by a beam, then the number of such beams are -

- (1) 190 (2) 170 (3) 20 (4) 100

Ans. [2]

Q.24 Negation of statement $\sim s \vee (\sim r \wedge s)$ is-

- (1) $\sim s \rightarrow r$ (2) $(s \vee r)$ (3) $(s \wedge r)$ (4) $\sim s \wedge r$

Ans. [3]

Q.25 Let $f(x) = \log_e(\sin x)$ and $g(x) = \sin^{-1}e^{-x}$ for all $x \in (0, \pi)$ and $f\{g(\alpha)\} = b$ and $f\{g(x)\}'$ at $x = \alpha$ is a then which is true -

- (1) $a\alpha^2 - b\alpha + 1 = a$ (2) $a\alpha^2 - b\alpha = -a$ (3) $a\alpha^2 - b\alpha + 1 = -a$ (4) $a\alpha^2 - b\alpha - 1 = -a$

Ans. [3]

Q.26 A straight line parallel to the straight line $4x - 3y + 2 = 0$ is at a distance of $\frac{3}{5}$ units from the origin. Then which of the following point lie on the line

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

Ans. [2]

Q.27 If the foot of perpendicular drawn from a point on the line $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z}{1}$ on the plane $x + y + z = 3$ also lies on the plane $x - y + z = 3$, then the coordinates of the foot of perpendicular is -

- (1) $(-2, 0, 5)$ (2) $(-1, 0, 4)$ (3) $(1, 0, 2)$ (4) $(2, 0, 1)$

Ans. [4]