



JEE Main Online Exam 2019

Questions & Solutions

8th April 2019 | Shift - I

(Memory Based)

MATHEMATICS

Q.1 Let $\cos(A + B) = \frac{3}{5}$ and $\sin(A - B) = \frac{5}{13}$ where $0 < A, B < \frac{\pi}{4}$, then $\tan 2A =$

- (1) $\frac{56}{33}$ (2) $\frac{25}{16}$ (3) $\frac{63}{16}$ (4) $\frac{20}{7}$

Ans. [3]

Q.2 Perimeter of ΔAOP is 4 unit and two vertices are $A(0, 1)$ and $O(0, 0)$ then locus of P is

- (1) $9x^2 + 8y^2 - 8y - 16 = 0$ (2) $9x^2 + 8y^2 - 8y - 15 = 0$
(3) $8x^2 + 9y^2 - 8y - 16 = 0$ (4) $x^2 + y^2 + x + y = 0$

Ans. [1]

Q.3 The area satisfy given inequality

$y \leq 3x - x^2$, $0 \leq x \leq 3$, $0 \leq y \leq 4$ is -

- (1) $\frac{9}{4}$ (2) $\frac{9}{2}$ (3) $\frac{9}{7}$ (4) 2

Ans. [2]

Q.4 Mean and variance of seven variates are 8 & 16 respectively. Out of seven variates five numbers are 2, 4, 10, 12, 14. Then the product of remaining two variates is

- (1) 14 (2) 48 (3) 12 (4) 2

Ans. [2]

Q.5 Let $f''(x) > 0$ in $x \in (0, 2)$ and $\phi(x) = f(x) + f(2 - x)$ then $\phi(x) -$

- (1) Increases on $(0, 1)$ and decreases on $(1, 2)$
(2) Decreases on $(0, 1)$ and increases on $(1, 2)$
(3) Increases on $(0, 2)$
(4) Decreases on $(0, 2)$

Ans. [2]



Q.6 Let the equation of the line $3x + 5y = 15$ and a point P on this line equidistant from the x and y axes, in which quadrant the point P lies

- (1) 1st (2) 3rd (3) 4th (4) None

Ans. [1]

Q.7 Root of quadratic equation $x^2 - 2x + 2 = 0$ are α and β . Then minimum value of n such that $\left(\frac{\alpha}{\beta}\right)^n = 1$ is -

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

Ans. [4]

Q.8 The contrapositive of the statement "If I am an Indian, then I am born in India" is -

- (1) If I am not born in India, then I am an Indian
(2) If I am not born in India, then I am not an Indian
(3) If I am not an Indian, then I am not born in India
(4) If I am born in India, then I am an Indian

Ans. [2]

Q.9 $\int \frac{\sin\left(\frac{5x}{2}\right)}{\sin\left(\frac{x}{2}\right)} dx$ is equal to

- (1) $x - \sin 2x - 2 \sin x + C$ (2) $x + \sin 2x - 2 \sin x + C$
(3) $x + \sin 2x + 2 \sin x + C$ (4) $x - \sin 2x + 2 \sin x + C$

Ans. [3]

Q.10 The shortest distance between the line $x = y$ & the parabola $y^2 = x - 2$ is -

- (1) greater than 4 (2) less than 2 (3) greater 3 (4) greater than 2

Ans. [2]

Q.11 Sum of coefficient of even power of x in binomial expansion

$(x + \sqrt{x^3 - 1})^6 + (x - \sqrt{x^3 - 1})^6$ is -

- (1) 11 (2) 13 (3) 24 (4) 14

Ans. [3]

Q.12 How many 9 digit numbers can be formed using digits 1, 1, 2, 2, 2, 2, 3, 4, 4 so that all odd numbers occur at even places is

- (1) 90 (2) 45 (3) 180 (4) 360

Ans. [3]



Q.13 $\lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} - \sqrt{1 + \cos x}}$ is -

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

Ans. [3]

Q.14 The line $x + y = n$: ($n \in \mathbb{N}$) makes intercept with circle $x^2 + y^2 = 16$ then the sum of square of length of chords intercepted by circle

- (1) 210 (2) 160 (3) 190 (4) 105

Ans. [1]

Q.15 If $A \subset B$ then -

- (1) $P(A/B) \geq P(A)$ (2) $P(A/B) \leq P(A)$ (3) $P(A/B) = 1$ (4) $P\left(\frac{A}{B}\right) < P(A)$

Ans. [1]

Q.16 Let $g(x) = \log_e x$ and $f(x) = \frac{1 - x \cos x}{1 + x \cos x}$ then $\int_{-\pi/4}^{\pi/4} g[f(x)] dx$ is equal to -

- (1) $\log_e 1$ (2) $\log_e 2$ (3) $\log_e e$ (4) $\log_e 4$

Ans. [1]

Q.17 $|\sqrt{x} - 2| + \sqrt{x}(\sqrt{x} - 4) + 2 = 0$ ($x > 0$)

The sum of solution is -

- (1) 10 (2) 9 (3) 3 (4) 5

Ans. [1]

Q.18 If $f(x) = \log_e \left(\frac{1-x}{1+x} \right)$, then the value of $f\left(\frac{2x}{1+x^2} \right)$ in terms of $f(x)$ is

- (1) $2f(x)$ (2) $f(x)$ (3) $-f(x)$ (4) $-2f(x)$

Ans. [1]

Q.19 If the tangents at the points $A(1, 2)$ and $B(a, b)$ of the ellipse $4x^2 + y^2 = 8$ are perpendicular then a^2 equals -

- (1) $\frac{17}{2}$ (2) $\frac{2}{17}$ (3) $\frac{4}{17}$ (4) $\frac{3}{17}$

Ans. [2]



Q.26 Find the magnitude of projection of vector $2\hat{i} + 3\hat{j} + \hat{k}$ on a vector which is perpendicular to the plane containing vector $\hat{i} + \hat{j} + \hat{k}$ and $\hat{i} + 2\hat{j} + 3\hat{k}$ is -

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

Ans. [1]

Q.27 The perpendicular distance of point (2, -1, 4) from the line $\frac{x+3}{10} = \frac{y-2}{-7} = \frac{z}{1}$ lies between -

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

Ans. [2]

Q.28 Let $2 \cdot {}^{20}C_0 + 5 \cdot {}^{20}C_1 + 8 \cdot {}^{20}C_2 + \dots + 62 \cdot {}^{20}C_{20}$ then the sum of this series is -

- (1) $8 \cdot 2^{20}$ (2) $8 \cdot 2^{21}$ (3) $16 \cdot 2^{21}$ (4) $16 \cdot 2^{22}$

Ans. [3]

Q.29 Sum of the natural number between 100 and 200 whose H.C.F. with 91 should be more than 1

- (1) 1121 (2) 3210 (3) 3121 (4) 1520

Ans. [3]