



JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

10th January 2019 | Shift - I

MATHEMATICS

Q.1 If $\sum_{i=1}^{n=20} \left(\frac{{}^n C_{i-1}}{{}^n C_i + {}^n C_{i-1}} \right)^3 = \frac{k}{21}$ then k is equal to

- (1) 100 (2) 200 (3) 300 (4) 400

Ans. [1]

Q.2 If $y^2 = 4b(x - c)$ and $y^2 = 8ax$ having common normal then (a, b, c) is

- (1) $\left(\frac{1}{2}, 2, 0 \right)$ (2) (1, 1, 3) (3) (1, 1, 1) (4) (1, 3, 2)

Ans. [4]

Q.3 Sum of all two digit numbers divisible by 7 leaves remainder 2 or 5 is

- (1) 1300 (2) 1345 (3) 1465 (4) 1356

Ans. [4]

Q.4 If $P : (n^2 + 41 - n)$ is a prime number. Then which of the following is true

- (1) P(3) is even (2) P(5) is even
(3) P(3) and P(5) both are even (4) None

Ans. [3]

Q.5 If $\sin^2 2\theta + \cos^4 2\theta = \frac{3}{4}$; $\theta \in \left(0, \frac{\pi}{2} \right)$ then sum of all values of θ is

- (1) $\pi/2$ (2) π (3) $3\pi/2$ (4) None of these

Ans. [1]

Q.6 Mean of five observations is 5, out of three are 1, 3, 8. Variance of them is 9.20. Then the ratio of two number is

- (1) 4/9 (2) 3/2 (3) 10/3 (4) 5/8

Ans. [1]

Q.7 $I = \int \frac{((\sin x)^n - \sin x)^{1/n}}{(\sin x)^{n+1}} \cos x \, dx$ is equal to

(1) $\left(\frac{n}{n^2-1}\right) \left(1 - \frac{1}{(\sin x)^{n-1}}\right)^{\frac{1}{n}+1} + c$

(2) $\left(\frac{n}{n^2+1}\right) \left(1 - \frac{1}{(\sin x)^{n-1}}\right)^{\frac{1}{n}+1} + c$

(3) $\frac{n}{n^2+1} \left(1 - \frac{1}{(\sin x)^{n-1}}\right)^{\frac{1}{n}} + c$

(4) $\frac{n}{n^2-1} \left(1 - \frac{1}{\sin x}\right)^{\frac{1}{n}+1} + c$

Ans. [1]

Q.8 Minimum value of $\int_A^B (x^4 - 2x^2) \, dx$ then (A, B) is

(1) $(-\sqrt{2}, \sqrt{2})$

(2) $(0, \sqrt{2})$

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

(4) None

Ans. [1]

Q.9 Toss a coin if head comes, two dices thrown simultaneously. If tail come, draw a card from number 1 to 9. What is probability of sum of number on dice 7 or 8 and number of card also 7 or 8. When head comes

(1) $9/72$

(2) $19/72$

(3) $15/36$

(4) $72/00$

Ans. [2]

Q.10 Sides of ΔABC , $AB = 7$ cm, $BC = 5$ cm, $CA = 6$ cm. A pole is stand at mid point of side AC. Angle of elevation of pole from vertex B is 30° , find height of pole

(1) $\frac{\sqrt{7}}{\sqrt{3}}$

(2) $\frac{2\sqrt{7}}{\sqrt{3}}$

(3) $2\sqrt{21}$

(4) $2\sqrt{7}$

Ans. [2]

Q.11 If $6x + 8y = 48$ cut axes at two points A & B, origin (O) then incentre of ΔAOB is

(1) (2, 4)

(2) (4, 4)

(3) (2, 2)

(4) (4, 2)

Ans. [3]

Q.12 If $f(x) = x^3 + x^2 f'(1) + x f''(2) + f'''(3)$. Then $f(2)$ is

(1) -2

(2) 1

(3) 30

(4) 2

Ans. [1]

Q.13 If the area between the curves $y = kx^2$ and $x = ky^2$ is 1, then k is

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

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

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

(4) 1

Ans. [2]

- Q.14** In a school 140 students which is numbered from 1 to 140 even numbered opt Maths, multiples of 3 opt Chemistry multiple of 5 opt Physics. How many number of students of which opt none of them
(1) 26 (2) 34 (3) 30 (4) 38

Ans. [4]

- Q.15** If $\frac{dy}{dx} + \frac{3y}{\cos^2 x} = \frac{1}{\cos^2 x}$, $y\left(\frac{\pi}{4}\right) = \frac{4}{3}$, then $y\left(-\frac{\pi}{4}\right)$ is
(1) $\frac{1}{3}e^3$ (2) $\frac{1}{3}e^6$ (3) $\frac{1}{3}e^9$ (4) $\frac{1}{3}e^{12}$

Ans. [2]

- Q.16** The radius of the circle which touches circle $(x+2)^2 + (y-3)^2 = 25$ at point $(1, -1)$ and passes through $(4, 0)$ is
(1) 4 (2) 5 (3) 3 (4) 8

Ans. [2]

- Q.17** $\lim_{x \rightarrow 1^+} \frac{(1-|x| - \sin|1-x|)\left(\sin\frac{\pi}{2}[1-x]\right)}{(1-|x|) \cdot ([1-x])}$, where $[.]$ is greatest integer function, is equal to
(1) 1 (2) 2 (3) 3 (4) 4

Ans. [2]

- Q.18** $f(x) = \begin{cases} \max(|x|, x^2) & |x| \leq 2 \\ 8 - 2|x| & 2 < x \leq 4 \end{cases}$ is
(1) discontinuous at $x = 1$ (2) discontinuous at $x = 2$
(3) non differentiable at $x = 2$ (4) discontinuous at $x = -1$

Ans. [3]

- Q.19** If $(c-5)x^2 - 2cx + (c-4) = 0$ has one root in each $(0, 2)$ and $(2, 3)$ then number of integral values of c is
(1) 18 (2) 11 (3) 13 (4) None of these

Ans. [2]

- Q.20** The equation of tangent to hyperbola $4x^2 - 5y^2 = 20$ which is parallel to $x - y = 2$ is
(1) $x - y + 3 = 0$ (2) $x - y + 1 = 0$ (3) $x - y = 0$ (4) $x - y - 3 = 0$

Ans. [2]

- Q.21** System of equations $x + y + z = 2$,
 $x + 2y + 3z = 5$,
 $x + 3y + \beta z = \alpha$
has infinitely many solution then $\beta - \alpha$ is equal to
(1) 3 (2) -3 (3) 5 (4) -5

Ans. [2]



Q.22 If the third term in expansion of $(1 + x^{\log_2 x})^5$ is 2560 then x is equal to

- (1) $2\sqrt{2}$ (2) $\frac{1}{8}$ (3) $\frac{1}{4}$ (4) $4\sqrt{2}$

Ans. [3]

Q.23 5, 5r, 5r² are sides of a triangle. Which value of r cannot be possible

- (1) 3/2 (2) 5/4 (3) 3/4 (4) 7/4

Ans. [4]

Q.24 The shortest distance of point (3/2, 0) from $y = \sqrt{x}$ is

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

Ans. [2]