CAREER POINT

JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

9th January 2019 | Shift - II

MATHEMATICS

Q.1 $[\sim(p \vee \sim q) \wedge (p \wedge r)\} \wedge (p \wedge \sim q)]$ is equal to

(1) Tautology (2) Fallacy

(3) Neither Tautology nor Fallacy (4) None of these

Ans. **[2]**

Q.2 $1 + 6 + 9\left(\frac{1^2+2^2+3^2}{7}\right) + 12\left(\frac{1^2+2^2+3^2+4^2}{9}\right) + 15\left(\frac{1^2+2^2+3^2+4^2+5^2}{11}\right) + ...$

Find sum upto 15 terms.

(1) 7720 (2) 7820 (3) 7980 (4) 8020

Ans. **[2]**

Q.3 If $x = 3\tan\theta$, $y = 3\sec\theta$. Then value of $\frac{d^2y}{dx^2}$ at $x = \frac{\pi}{4}$ is-

(1) $\frac{1}{6\sqrt{2}}$ (2) $\frac{1}{3\sqrt{2}}$ (3) 3 (4) $\frac{1}{6}$

Ans. **[1]**

Q.4 How many natural number are possible by using digits 0,1,3,7,9 (repetition is allowed) which are less than 7000.

(1) 373 (2) 374 (3) 333 (4) 322

Ans. **[2]**

Q.5 A Bag contains 5 red and 2 green balls. One ball is drawn at random. If drawn ball is red, then a green ball is added in bag. If drawn ball is green then a red ball is added in bag. If another ball is drawn random then find the probability that this ball is red.

(1) $\frac{15}{49}$ (2) $\frac{17}{49}$ (3) $\frac{19}{49}$ (4) $\frac{6}{49}$

Ans. **[2]**

Q.6 In the expansion of $\left(\frac{1-t^6}{1-t}\right)^3$, the coefficient of t^4 is-

(1) 16 (2) 15 (3) 12 (4) 10

Ans. **[2]**

Q.7 If equation of circles are $(x-8)^2+(y-10)^2=r^2$ and $(x-7)^2+(y-4)^2=36$. These two circles cuts two different points. Then r is-

(1) 11 (2) > 11 (3) < 11 (4) $0 < r < 11$

Ans. **[1]**

Q.8 A hyperbola whose centre is (0, 0) and passes through (4, 2) and its transverse axis is along x-axis and length of transverse axis is 4, then eccentricity is-

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

Ans. **[3]**

Q.9 If the roots of $x^2-mx+4=0$ are real and different and lies in [1, 5]. Then m lies in

(1) (–5, –4) (2) (3, 4) (3) (5, 6) (4) (4, 5)

Ans. **[4]**

Q.10 If $x=\sin^{-1}(\sin 10)$ and $y=\cos^{-1}(\cos 10)$. Then $y-x=$

(1) 7π (2) 0 (3) 10 (4) π

Ans. **[4]**

Q.11 $|f(x)-f(y)| \le 2|x-y|^{3/2}$; $f(0)=1$. Then $\int_0^1 f^2(x)dx$ is

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

Ans. **[1]**

Q.12 $\int_0^{\pi/3} \frac{\tan\theta}{\sqrt{2k\sec\theta}}d\theta = 1-\frac{1}{\sqrt{2}}$. Then k is-

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

Ans. **[3]**

Q.13 $\lim_{x\to 0^-} \frac{x([x]+|x|)\sin[x]}{|x|}$ equals ([.] represent G.I.F.)

(1) –sin 1 (2) 0 (3) 1 (4) 2

Ans. **[1]**

Q.14 z_0 is the roots of $1 + x + x^2 = 0$ and $z = 3 + 6i\, z_0^{81} - 3\, z_0^{93}$. Then arg(z) is-

(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{6}$ (3) $\frac{\pi}{9}$ (4) $\frac{\pi}{2}$

Ans. **[4]**

Q.15 If $\sin\theta - \sin2\theta + \sin3\theta = 0$. Then number of solutions in $\left[0, \frac{\pi}{2}\right)$

(1) 5 (2) 4 (3) 2 (4) 3

Ans. **[3]**

Q.16 If a, b, c are three terms of 7^{th}, 11^{th} and 13^{th} terms of A.P. (non-constant) are three successive terms of G.P. Then $\frac{a}{c}$ =

(1) 4 (2) $\frac{7}{13}$ (3) 2 (4) none of these

Ans. **[1]**

Q.17 If $\sum_{i=1}^{n}(x_i + 1)^2 = 9n$ and $\sum_{i=1}^{n}(x_i - 1)^2 = 5n$. Then standard deviation is-

(1) $\sqrt{5}$ (2) $\sqrt{7}$ (3) 5 (4) none of these

Ans. **[1]**

Q.18 $\int \frac{5x^8 + 6x^7}{(2x^7 + x^2 + x)^2} dx$ =

(1) $\frac{1}{2 + x^{-5} + x^{-6}} + C$ (2) $\frac{1}{(2 + x^{-10} + x^{-7})} + C$

(3) $\frac{1}{2 + x^{-2} + x^{-5}} + C$ (4) $\frac{1}{2 + x^{-4} + x^{-10}} + C$

Ans. **[1]**

Q.19 If $\vec{a} = \hat{i} + \hat{j} + \sqrt{2}\,\hat{k}$, $\vec{b} = b_1\hat{i} + b_2\hat{j} + \sqrt{2}\,\hat{k}$ and $\vec{c} = 5\hat{i} + \hat{j} + \sqrt{2}\,\hat{k}$. Projection of $\vec{b}$ on $\vec{a}$ is $|\vec{a}|$ and $\vec{a} + \vec{b}$ is perpendicular to $\vec{c}$. Find $|\vec{b}|$ = ?

(1) 6 (2) 8 (3) 7 (4) none of these

Ans. **[1]**

Q.20 If two sides of a triangle are $4x + 5y - 20 = 0$ and $3x - 2y + 6 = 0$ with orthocentre (1, 1). Then equation of third sides is-

(1) $26x - 122y - 1675 = 0$ (2) $26x - 122y + 1675 = 0$

(3) $122x - 26y + 1575 = 0$ (4) $122x + 26y + 1675 = 0$

Ans. **[1]**

Q.21 On parabola $y^2 = 4x$ three point A(4, –4), B(9, 6) and C lies on it then area of ΔABC(max.) is-

(1) $31\frac{1}{2}$ (2) $33\frac{1}{2}$ (3) 31 (4) $31\frac{1}{4}$

Ans. **[4]**

Q.22 Find the area bounded by $\{(x, y) : 0 \le y \le x|x| + 1$, where $1 < x < 1$

(1) 2 (2) 4 (3) 8 (4) 6

Ans. **[1]**

Q.23 If the lines $x = a'y + b'$, $z = cy + b$ and $x = az + d$, $y = c'z + d'$ are perpendicular, then required condition is-

(1) $aa' + c + d' = 0$ (2) $aa' + c + d = 0$ (3) $aa' + c' + d = 0$ (4) $aa' + c' + c = 0$

Ans. **[4]**

Q.24 $f(x) = \frac{2x}{x-1}$; $f : A \to R$, x is non real positive value. Then relation will be-

(1) surjective (2) not injective (3) not surjective (4) none of these

Ans. **[3]**

Q.25 Find the number of positive integral values of 'α' for which roots of equation $6x^2 - 11x + \alpha = 0$ are rational

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

Ans. **[1]**

Q.26 Let y(x) is a solution of $\frac{dy}{dx} = f(x)$, where $f(xy) = f(x)\, f(y)\ \forall\ x, y \in R$ and $f(0) \neq 0$ and $y(0) = \frac{1}{2}$ then $y\left(\frac{1}{4}\right) + y\left(\frac{3}{4}\right)$ is equal to

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

Ans. **[3]**

Q.27 If S is a set of triangles whose one vertex is origin and other two vertices are integral coordinates and lies on coordinate axis of area of 50 sq. units then number of element in set S is equal to

(1) 40 (2) 36 (3) 18 (4) 9

Ans. **[2]**

Q.28 $A = \begin{bmatrix} e^t & e^{-t}(\sin t - 2\cos t) & e^{-t}(-2\sin t - \cos t) \\ e^t & -e^t(2\sin t + \cos t) & e^{-t}(\sin t - 2\cos t) \\ e^t & e^{-t}\cos t & e^{-t}\sin t \end{bmatrix}$ is invertible

(1) only if $t = \frac{\pi}{2}$ (2) $t \in R$ (3) only if $t = \pi$ (4) $t \notin R$

Ans. **[2]**