CAREER POINT

JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

Morning | 9th January 2019

MATHEMATICS

Q.1 Two cards are chosen from a deck of cards with replacement and X is a random variable for the number of Aces chosen. Then P(x = 1) + P(x = 2) is

(1) $\frac{35}{169}$ (2) $\frac{55}{169}$ (3) $\frac{65}{169}$ (4) $\frac{25}{169}$

Ans. **[4]**

Q.2 Average height and variance of 5 students in a class is 150 and 18 respectively. If we add one student whose height is 156 cm then new variance is

(1) 21 (2) 24 (3) 25 (4) 20

Ans. **[4]**

Q.3 The value of $3(\cos\theta - \sin\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4\sin^6\theta$ is

(1) $13 - 4\cos^4\theta$ (2) $13 - 4\cos^2\theta + 2\sin^4\theta\cos^2\theta$

(3) $13 - 4\cos^6\theta$ (4) $13 - 4\cos^6\theta + 2\sin^4\theta\cos^2\theta$

Ans. **[3]**

Q.4 If $\vec{a} = \hat{i} - \hat{j}$, $\vec{b} = \hat{i} + \hat{j} + \hat{k}$ are two vectors and $\vec{c}$ is another vector such that $\vec{a} \times \vec{c} + \vec{b} = 0$ and $\vec{a}.\vec{c} = 0$ then $|\vec{c}|^2 =$

(1) $\frac{15}{2}$ (2) $\frac{19}{2}$ (3) $\frac{17}{2}$ (4) $\frac{21}{2}$

Ans. **[2]**

Q.5 $a_1, a_2, \ldots a_{10}$ are in A.P., $a_5 = 27$, $a_{10} = ?$

$S = \sum_{i=1}^{i=30} a_i$ & $T = \sum_{i=1}^{15} a(2i-1)$, $S - 2T = 75$

(1) 53 (2) 52 (3) 56 (4) 57

Ans. **[2]**

Q.6 The equation of the common tangent to the parabola $y^2 = 4x$ and the circle $x^2 + y^2 - 6x = 0$ is

(1) $y = \pm\frac{1}{\sqrt{3}}x \pm \sqrt{3}$ (2) $y = \frac{1}{\sqrt{2}}x \pm \sqrt{2}$

(3) $y = \sqrt{3}x + \sqrt{2}$ (4) $y = \pm\sqrt{3}x \pm \frac{1}{\sqrt{3}}$

Ans. **[1]**

Q.7 If $x^2 + 2x + 2 = 0$. Then $\alpha^{15} + \beta^{15}$ is

(1) 2^9 (2) -2^8 (3) 2^8 (4) 2^{11}

Ans. **[2]**

Q.8 If $\frac{x^2}{\cos^2\theta} - \frac{y^2}{\sin^2\theta} = 1$ and $e > 2$. Then the range of length of latus rectum is $\left(\theta \in \left(0, \frac{\pi}{2}\right)\right)$

(1) (1, 3/2) (2) (2, 3) (3) $(3, \infty)$ (4) (3, 4)

Ans. **[3]**

Q.9 If p and q are the statement the $(p \oplus q) \wedge (\sim p \Theta q)$ is equivalent to $(p \wedge q)$ then ordered value of $(\oplus, \Theta)$ is

(1) $\wedge, \wedge$ (2) $\vee, \vee$ (3) $\wedge, \vee$ (4) $\vee, \wedge$

Ans. **[3]**

Q.10 If a, b, c are in G.P. then $a + b + c = xb$. Then $x \neq$

(1) –2 (2) –3 (3) 4 (4) 2

Ans. **[4]**

Q.11 $\left\{\frac{2^{403}}{15}\right\} = \frac{k}{15}$. Then k is

(1) 8 (2) 9 (3) 10 (4) 7

Ans. **[1]**

Q.12 $\lim\limits_{x\to 0}\frac{\sqrt{1+\sqrt{1+x^4}} - \sqrt{2}}{x^4}$ is equal to -

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

Ans. **[4]**

Q.13 The area bounded by the curve $y = x^2 - 1$ and tangent to it at (2, 3) and y-axis is

(1) 8/3 (2) 2/3 (3) 4/3 (4) 1/3

Ans. **[1]**

Q.14 A plane parallel to y axis passing through line of intersection of planes x + y + z = 1 and 2x + 3y – z = 4, then which of the point lies on the plane

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

Ans. **[2]**

Q.15 If $f_1(x) = \frac{1}{x}$, $f_2(x) = 1 - x$, $f_3(x) = \frac{1}{1-x}$ and $(f_2 o J o f_1)(x) = f_3(x)$. Find out J(x)

(1) $f_1(x)$ (2) $\frac{f_3(x)}{x}$ (3) $f_3(x)$ (4) $\frac{f_2(x)}{x}$

Ans. **[3]**

Q.16 $f(x) = \begin{cases} 5 & x < 1 \\ a + bx & 1 \le x < 3 \\ b + 5x & 3 \le x < 5 \\ 30 & x \ge 5 \end{cases}$, what is possible value of a & b if f(x) is continuous for $x \in R$

(1) a = 0, b = 10 (2) a = –5, b = 10 (3) a, b $\in \phi$ (4) a = –5, b = 0

Ans. **[3]**

Q.17 If $\cos^{-1}\left(\frac{2}{3x}\right) + \cos^{-1}\left(\frac{3}{4x}\right) = \frac{\pi}{2}$, $x > \frac{3}{4}$ then find x

(1) $\frac{\sqrt{145}}{13}$ (2) $\frac{\sqrt{155}}{12}$ (3) $\frac{\sqrt{145}}{12}$ (4) $\frac{\sqrt{155}}{13}$

Ans. **[3]**

Q.18 $\frac{3 + 2i\sin\theta}{1 - 2i\sin\theta}$, $\theta \in \left(-\frac{\pi}{2}, \pi\right)$ is purely imaginary. Find sum of all value of θ

(1) $2\pi/3$ (2) $\pi/3$ (3) $4\pi/3$ (4) π

Ans. **[1]**

Q.19 $\int x\sqrt{\frac{2\sin(x^2-1) + \sin 2(x^2-1)}{2\sin(x^2-1) - \sin 2(x^2-1)}}\,dx$, $(x^2 \ne n\pi + 1, n \in N)$ equals-

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

(3) $\log_e \sec\left(\frac{x^2-1}{2}\right) + C$ (4) $\frac{1}{2}\log_e \sec\left(\frac{x^2-1}{2}\right) + c$

Ans. **[4]**

Q.20 If $a < b < c$ then three circles are touching each other externally and have x-axis as a common tangent, then -

(1) $\sqrt{a} + \sqrt{c} = \sqrt{b}$ (2) $\frac{1}{\sqrt{b}} + \frac{1}{\sqrt{c}} = \frac{1}{\sqrt{a}}$

(3) a, b, c are in A.P. (4) $a^2 + c^2 = b^2$

Ans. **[2]**

Q.21 If θ is angle of intersection between $y = 10 - x^2$ and $y = 4 + x^2$ then $|\tan\theta|$ is –

(1) $\frac{5\sqrt{3}}{11}$ (2) $\frac{7\sqrt{3}}{15}$ (3) $\frac{4\sqrt{3}}{11}$ (4) None

Ans. **[3]**

Q.22 Find the equation of line through (–4, 1, 3) & parallel to the plane $x + y + z = 3$, while the line intersects another line $\frac{x-5}{-1} = \frac{y+5}{2} = \frac{z-0}{1}$ is -

(1) $\frac{x+4}{-3} = \frac{y-1}{-2} = \frac{z-3}{1}$ (2) $\frac{x+4}{1} = \frac{y-1}{2} = \frac{z-3}{-3}$

(3) $\frac{x+4}{-3} = \frac{y-1}{2} = \frac{z-3}{1}$ (4) $\frac{x+4}{-1} = \frac{y-1}{2} = \frac{z-3}{-3}$

Ans. **[3]**

Q.23 $\int_0^{\pi} |\cos x|^3 dx =$

(1) 0 (2) $\frac{4}{3}$ (3) $\frac{8}{3}$ (4) $\frac{2}{3}$

Ans. **[2]**

Q.24 If $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ then A^{-50} at $\theta = \frac{\pi}{12}$ is equal to

(1) $\begin{bmatrix} -\sqrt{3}/2 & -1/2 \\ -1/2 & \sqrt{3}/2 \end{bmatrix}$ (2) $\begin{bmatrix} 1/2 & \sqrt{3}/2 \\ \sqrt{3}/2 & -1/2 \end{bmatrix}$

(3) $\begin{bmatrix} -\sqrt{3}/2 & 1/2 \\ 1/2 & \sqrt{3}/2 \end{bmatrix}$ (4) $\begin{bmatrix} \sqrt{3}/2 & 1/2 \\ -1/2 & \sqrt{3}/2 \end{bmatrix}$

Ans. **[4]**

Q.25 If 5 girls and 7 boys are in a class. How many number of groups can be made by 2 girls and 3 boys in which two particular boys never comes together

(1) 280 (2) 310 (3) 300 (4) 305

Ans. **[3]**

Q.26 There is a parabola having axis as x-axis, vertex is at a distance of 2 units from origin and focus is at (4, 0) which of the point does not lie on the parabola.

(1) (6, 8) (2) $(5, 2\sqrt{6})$ (3) $(8, 4\sqrt{3})$ (4) (4, – 4)

Ans. **[1]**

Q.27 If y(x) is solution of $x\frac{dy}{dx} + 2y = x^2$, $y(1) = 1$ then value of $y\left(\frac{1}{2}\right)$ is equal to

(1) $-\frac{49}{16}$ (2) $\frac{45}{8}$ (3) $\frac{49}{16}$ (4) $-\frac{45}{8}$

Ans. **[3]**

Q.28 If slant height of a right circular cone is 3 cm then the maximum value of cone is -

(1) $4\sqrt{3}\,\pi$ (2) $2\sqrt{3}\,\pi$ (3) $(2+\sqrt{3})\pi$ (4) $(2-\sqrt{3})\pi$

Ans. **[2]**

Q.29 If px + qy + r = 0 represent family of straight lines such that 3p + 2q + 4r = 0 then

(1) All lines are parallel (2) All line are concurrent at $\left(\frac{3}{4}, \frac{1}{2}\right)$

(3) All lines are concurrent at (3, 2) (4) None of these

Ans. **[2]**

Q.30 Consider the system of equation x + y + z = 1, 2x + 3y + 2z = 1, $2x + 3y + (a^2 - 1)z = a + 1$, then

(1) System is inconsistent for $|a| = \sqrt{3}$ (2) System is inconsistent for a = 4

(3) System is inconsistent for a = 3 (4) System is inconsistent for a = 5

Ans. **[1]**