CAREER POINT

JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

12th January 2019 | Shift - II

MATHEMATICS

Q.1 If $A=\begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$ where $\theta \in \left[\frac{3\pi}{4}, \frac{5\pi}{4}\right]$ then det (A) lies between

(1) $\left[1, \frac{5}{2}\right]$ (2) $\left[1, \frac{3}{2}\right]$ (3) $\left[\frac{3}{2}, \frac{5}{2}\right]$ (4) $\left[\frac{3}{2}, 4\right]$

Ans. **[4]**

Q.2 If $|z_1| = 9$ and $|z_2 - 3i - 4| = 4$. Then $|z_1 - z_2|_{\text{minium value}}$ is

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

Ans. **[1]**

Q.3 $\int \frac{3x^{13}+2x^{11}}{(2x^4+3x^2+1)^4}\,dx$ is equal to

(1) $\frac{1}{6}\times\frac{1}{\left(2+\frac{3}{x^2}+\frac{1}{x^4}\right)^3}+c$ (2) $\frac{1}{12}\times\frac{1}{\left(2+\frac{3}{x^2}+\frac{1}{x^4}\right)^2}+c$

(3) $\frac{1}{24}\times\frac{1}{\left(2+\frac{3}{x^2}+\frac{1}{x^4}\right)^3}+c$ (4) None of these

Ans. **[1]**

Q.4 If $\vec{a}, \vec{b}$ and $\vec{c}$ are unit vectors and α be the angle between $\vec{a}$ & $\vec{b}$ and β be the angle between $\vec{a}$ & $\vec{c}$. Given that $\vec{a}\times(\vec{b}\times\vec{c}) = \frac{1}{2}\vec{b}$, then $|\alpha - \beta|$ is equal to

(1) $\pi/2$ (2) $\pi/3$ (3) $\pi/6$ (4) $\pi/4$

Ans. **[3]**

Q.5 If mean and variance are 4 and 5.2 respectively. Given that three observations are 3, 4, 4. Then out of five observations, absolute difference of remaining two observations is

(1) 4 (2) 5 (3) 6 (4) 7

Ans. **[4]**

Q.6 Sum of 15 terms of $\left(\frac{3}{4}\right)^3+\left(1\frac{1}{2}\right)^3+\left(2\frac{1}{4}\right)^3+(3)^3+\left(3\frac{3}{4}\right)^3+\ldots=225k$ then k equals

(1) 23 (2) 27 (3) 31 (4) 35

Ans. **[2]**

Q.7 $\frac{n}{n^2+1^2}+\frac{n}{n^2+2^2}+\frac{n}{n^2+3^2}+\ldots.+\frac{n}{n^2+4n^2}$ is equal to

(1) $\tan^{-1}2$ (2) $\tan^{-1}4$ (3) $\tan^{-1}3$ (4) $\frac{\pi}{4}$

Ans. **[1]**

Q.8 Two women and some men participated in a chess tournament in which every participant played two games with each of the other participants. If the number of games that the men played between themselves exceeds the number of game that the men played with the women by 84, then the number of men who participated in the tournament is –

(1) 10 (2) 12 (3) 14 (4) 16

Ans. **[2]**

Q.9 $\lim\limits_{x\to1^-}\frac{\sqrt{\pi}-\sqrt{2\sin^{-1}x}}{\sqrt{1-x}}$ is equal to

(1) $\sqrt{\frac{\pi}{2}}$ (2) $\sqrt{\frac{2}{\pi}}$ (3) $\sqrt{\frac{4}{\pi}}$ (4) None of these

Ans. **[2]**

Q.10 Given that f(1) = 2, f ′(x) = f(x) and h(x) = f(f(x)), then h′(1) is equal to

(1) e^2 (2) 3e (3) e (4) 4e

Ans. **[4]**

Q.11 If ${}^nC_4$, ${}^nC_5$ and ${}^nC_6$ are in A.P., then n is equal to

(1) 14 (2) 10 (3) 18 (4) 16

Ans. **[1]**

Q.12 $\sim(\sim p\to q)$ is equal to

(1) $\sim p\wedge q$ (2) $p\vee q$ (3) $\sim p\wedge\sim q$ (4) $p\wedge q$

Ans. **[3]**

Q.13 A curve passes through (1, 2) and slope is $\frac{x^2 - 2y}{x}$. Curve also passes through

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

Ans. **[3]**

Q.14 A man wins Rs. 100 if he gets 5 and 6 on tossing a dice and loss Rs. 50 if he gets any other number. If he decide to toss the dice till he wins or maximum 3 times then gain or loss is

(1) Rs $\frac{400}{3}$ gain (2) Rs $\frac{401}{3}$ gain (3) Rs $\frac{400}{3}$ loss (4) 0

Ans. **[4]**

Q.15 A circle of radius r passes through (0, 0) cuts the coordinate axis at A and B. Then the locus of foot of perpendicular from (0, 0) to AB is

(1) $(x^2 + y^2)^3 = 4r^2x^2y^2$ (2) $(x^2 + y^2)^{3/2} = 4r^2x^2y^2$

(3) $4r^2(x^2 + y^2)^3 = x^2y^2$ (4) $(x^3 + y^3)^2 = 4r^2x^2y^2$

Ans. **[1]**

Q.16 Two foci of ellipse are S and S′ and B lies on one end of minor axis such that SBS′ is right angle triangle with area 8 sq. unit then length of latus rectum (LR) is

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

Ans. **[2]**

Q.17 Number of irrational terms in the expansion of $(7^{1/5} - 3^{1/10})^{60}$ is

(1) 55 (2) 54 (3) 60 (4) None

Ans. **[2]**

Q.18 Tangent to parabola $y = x^2 - 5x + 5$ is parallel to line $2y = 4x + 1$ then tangent passes through the point

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

Ans. **[1]**

Q.19 Out of 60 students 40 opt NCC, 30 opt NSS and 20 both NCC and NSS. Then the probability that a student is neither from NCC Nor from NSS, is

(1) $\frac{1}{6}$ (2) $\frac{2}{3}$ (3) $\frac{5}{6}$ (4) $\frac{3}{5}$

Ans. **[1]**

Q.20 A line cut coordinate axes at A & B such that (–3, 4) is mid point of A and B. Then the equation of line is

(1) $3x - 4y + 24 = 0$ (2) $4x - 3y + 24 = 0$ (3) $3x - 4y = 24$ (4) None

Ans. **[2]**

Q.21 A tangent is drawn on the parabola $y^2 = 8x$ such that it makes angle θ with positive direction of x-axis then the equation of tangent is

(1) $x = y\cot\theta - 2\tan\theta$ (2) $x = y\tan\theta + 2\tan\theta$

(3) $y = x\tan\theta + 2\cot\theta$ (4) None of these

Ans. **[3]**

Q.22 If $x \in$ set of integer and $A = \{2^{(x+2)(x^2-5x+6)} = 1\}$, $B = \{-3 < 2x - 1 < 9\}$ then number of subsets of $A \times B$ is

(1) 2^{18} (2) 2^{15} (3) 2^{12} (4) None of these

Ans. **[2]**

Q.23 Angle of elevation of cloud from point P which is 25 meter above the lake is 30º. Angle of depression of its image from point P is 60º. Then height of cloud is

(1) 45 m (2) 75 m (3) 100 m (4) 50 m

Ans. **[4]**