CAREER POINT

JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

10th January 2019 | Shift - II

MATHEMATICS

Q.1 If $z = \left(\frac{\sqrt{3}}{2} + \frac{i}{2}\right)^5 + \left(\frac{\sqrt{3}}{2} - \frac{i}{2}\right)^5$ then

(1) Re(z) = 0 (2) $I_m(z) = 2$

(3) $Re(z) = -\sqrt{3}$ (4) $I_m(z) = -\sqrt{3}$

Ans. **[3]**

Q.2 If the sum of square of roots of $x^2 + (3 - \lambda)x + 2 = \lambda$ is minimum then λ is-

(1) –2 (2) 2 (3) 3 (4) 4

Ans. **[2]**

Q.3 $\cos\left(\frac{\pi}{2^2}\right) \ldots\ldots\ldots \cos\left(\frac{\pi}{2^{12}}\right).\sin\left(\frac{\pi}{2^{12}}\right) =$

(1) 0 (2) $\frac{1}{1024}$ (3) $\frac{1}{576}$ (4) $\frac{1}{2048}$

Ans. **[4]**

Q.4 $f(n) = \begin{cases} \frac{n-1}{2} & ; \quad n \in \text{odd number} \\ \frac{n}{2} & ; \quad n \in \text{even number} \end{cases}$; $g(n) = n - (-1)^n$, $n \in I$. Then fog is

(1) many one onto (2) many one into (3) one one into (4) one one onto

Ans. **[1]**

Q.5 In the expansion of $x^2\left(\sqrt{x} + \frac{\lambda}{x^2}\right)^{10}$. The coefficient of x^2 is 720 then λ is

(1) 4 (2) 9 (3) 2 (4) 3

Ans. **[1]**

Q.6 $\sum_{r=1}^{25}\left({}^{50}C_r \cdot {}^{50-r}C_{25-r}\right) = {}^{50}C_{25}(\lambda)$. Then λ is

(1) 2^{24} (2) 2^{25} (3) $2^{25} - 1$ (4) 2^{30}

Ans. **[3]**

Q.7 If the two points (0, 2) and (4, 3) of a triangle and orthocentre is (0, 0). Then third vertex is lies in which quadrant

(1) I[st] quadrant (2) II[nd] quadrant (3) III[rd] quadrant (4) IV[th] quadrant

Ans. **[2]**

Q.8 If $\int x^5 . e^{-4x^3} dx = \frac{1}{48} e^{-4x^3} . f(x) + c$ then $f(x) =$

(1) $(4x^3 + 1)$ (2) $-(4x^3 + 1)$ (3) $-(3x^3 + 1)$ (4) $-(2x^3 + 1)$

Ans. **[2]**

Q.9 In ΔABC, $\angle A + \angle B = 120^\circ$, $a = \sqrt{3} + 1$, $b = \sqrt{3} - 1$ then $\frac{\angle A}{\angle B} =$

(1) 1 : 7 (2) 2 : 7 (3) 7 : 1 (4) 3 : 7

Ans. **[3]**

Q.10 Solution of differential equation $(x^2 - y^2)dx + 2xydy = 0$ is

(1) a circle whose center on x-axis
(2) a circle whose center on y-axis
(3) a parabola whose axis is x-axis
(4) an ellipse whose major axis is x-axis

Ans. **[1]**

Q.11 System of equations $\sin 3\theta\, x - y + z = 0$
$\cos 2\theta\, x + 4y + 3z = 0$
$2x + 7y + 7z = 0$
has non-trivial solutions find number of values of θ if $\theta \in (0, \pi)$

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

Ans. **[1]**

Q.12 $\int_{-\pi/2}^{\pi/2} \frac{dx}{[x] + [\sin x] + 4}$ where [.] greatest integer function

(1) $\frac{3\pi}{5} - \frac{9}{20}$ (2) $\frac{4\pi}{5} - \frac{7}{20}$ (3) $\frac{2\pi}{5} - \frac{7}{20}$ (4) $\frac{3\pi}{5} - \frac{9}{20}$

Ans. **[1]**

Q.13 An equilateral triangle is inscribed in a circle $x^2 + y^2 + 10x + 12y + c = 0$ whose area is $27\sqrt{3}$ sq units then c is equal to

(1) 22 (2) 21 (3) –25 (4) 25

Ans. **[4]**

Q.14 Conic $\frac{y^2}{1+r}-\frac{x^2}{1-r}=1;\ r\neq\pm1$

(1) eccentricity of ellipse is $\sqrt{\frac{2}{r+1}}$ if $r>1$

(2) eccentricity of ellipse is $\sqrt{\frac{2}{r-1}}$ if $r>1$

(3) eccentricity of hyperbola is $\sqrt{\frac{2}{r-1}}$ if $r<1$

(4) eccentricity of hyperbola is $\sqrt{\frac{2}{r+1}}$ if $r>1$

Ans. **[1]**

Q.15 Two sides of a parallelogram are $x + y = 3$ & $x - y + 3 = 0$. Diagonals intersect at (4, 6). Then vertex of paralellogram can be

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

Ans. **[3]**

Q.16 $A=\begin{bmatrix}2 & b & 1\\ b & b^2+1 & b\\ 1 & b & 2\end{bmatrix}, b>0$

Find out minimum value of $\frac{\det.(A)}{b}$

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

Ans. **[2]**

Q.17 $f(x)$ = maximum $\{-|x|, -\sqrt{1-x^2}\}$. Find number of non-differentiable point in $(-1, 1)$

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

Ans. **[3]**

Q.18 The probability of hitting a target is $\frac{1}{3}$. Then minimum number of times the target should be hit so that probability of atleast one success is greater than $\frac{5}{6}$ is

(1) 3 (2) 4 (3) 5 (4) None of these

Ans. **[3]**

Q.19 $\cot\left[\sum_{n=1}^{19}\cot^{-1}\left(1+\sum_{p=1}^{n}2p\right)\right]=$

(1) $\frac{23}{19}$ (2) $\frac{19}{23}$ (3) $\frac{21}{19}$ (4) $\frac{19}{21}$

Ans. **[3]**

Q.20 Two vectors having equal amplitudes are satisfying the following relation: $|\vec{A}+\vec{B}| = n\ |\vec{A}-\vec{B}|$. Find the angle between both the vectors ?

(1) $\cos^{-1}\left(\frac{1-n^2}{1+4n^2}\right)$ (2) $\cos^{-1}\left(\frac{n^2}{1+n^2}\right)$ (3) $\cos^{-1}\left(\frac{n^2-1}{n^2+1}\right)$ (4) $\sin^{-1}\left(\frac{n^2}{1+n^2}\right)$

Ans. **[3]**

Q.21 P : 5 is prime number
Q : 7 is a factor of 192
R : L.C.M. of 7 and 5 is 35
which of the following has truth value true ?

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

Ans. **[3]**

Q.22 Chord of parabola $x^2 = 4y$ is $x - \sqrt{2}y + 4\sqrt{2} = 0$ then its length is

(1) $6\sqrt{2}$ (2) $6\sqrt{3}$ (3) 12 (4) $3\sqrt{6}$

Ans. **[2]**

Q.23 If $a_1, a_2, a_3, \ldots\ldots a_{10}$ are in G.P. and $\begin{vmatrix} \ln(a_1)^r(a_2)^k & \ln(a_2)^r(a_3)^k & \ln(a_3)^r(a_4)^k \\ \ln(a_4)^r(a_5)^k & \ln(a_5)^r(a_6)^k & \ln(a_6)^r(a_7)^k \\ \ln(a_7)^r(a_8)^k & \ln(a_8)^r(a_9)^k & \ln(a_9)^r(a_{10})^k \end{vmatrix} = 0$, $k \in$ natural number. Then the value of r is

(1) 2 (2) 4 (3) 10 (4) infinite

Ans. **[4]**

Q.24 If $\int_0^x f(t)\,dt = x^2 + \int_x^1 t^2 f(t)\,dt$ then $f'\left(\frac{1}{2}\right)$ is equal to

(1) $\frac{24}{25}$ (2) $\frac{1}{25}$ (3) $\frac{16}{25}$ (4) $\frac{21}{25}$

Ans. **[1]**

Q.25 Mean of 5 observations x_1, x_2, x_3, x_4, x_5 is 10 and standard deviation is 3 then variance of x_1, x_2, x_3, x_4, x_5 and –50 is

(1) 502.75 (2) 507.5 (3) 501.5 (4) 510.50

Ans. **[2]**

Q.26 If $\vec{\alpha} = (\lambda-2)\vec{a} + \vec{b}$, $\vec{\beta} = (4\lambda-2)\vec{a} + 3\vec{b}$ where $\vec{a}$, $\vec{b}$ are non collinear then λ for which $\vec{\alpha}$ & $\vec{\beta}$ are collinear

(1) –3 (2) –2 (3) –4 (4) –1

Ans. **[3]**

Q.27 A tangent is drawn to the curve $y = xe^{x^2}$ and it passes through (1, e) passes through which point

(1) $\left(\frac{4}{3}, 2e\right)$ (2) $\left(\frac{5}{3}, 2e\right)$ (3) $\left(-\frac{4}{3}, 2e\right)$ (4) $\left(\frac{7}{3}, 2e\right)$

Ans. **[1]**

Q.28 Line $\frac{x-4}{2} = \frac{y-3}{2} = \frac{z-5}{1}$ intersects plane $x + y + z = 2$ then their point of intersection lies on

(1) $\frac{x+2}{1} = \frac{y-3}{-1} = \frac{z-9}{3}$ (2) $\frac{x+4}{1} = \frac{y-6}{-2} = \frac{z+7}{3}$

(3) $\frac{x-2}{1} = \frac{y+3}{-1} = \frac{z-9}{3}$ (4) $\frac{x+4}{3} = \frac{y-7}{5} = \frac{z-5}{10}$

Ans. **[3]**

Q.29 A soldier is standing at point (1, 7). A helicopter is flying on a path $y - x^{3/2} = -2$. Find out the point where soldier hits helicopter at shortest distance

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

Ans. **[1]**