



JEE Main Online Exam 2019

[Memory Based Paper]

Questions & Answer

11th January 2019 | Shift - II

MATHEMATICS

Q.1 If $\frac{dy}{dx} = (x - y)^2$ and $y(1) = 1$, then -

(1) $\log_e \left| \frac{x - y}{x + y} \right| = x$

(2) $\log_e \left| \frac{1 - x + y}{1 + x + y} \right| = 2(x - 1)$

(3) $\log_e \left| \frac{x - 1 + y}{1 + x + y} \right| = 2(x - 1)$

(4) $\log_e \left| \frac{1 + x - y}{1 - x + y} \right| = 2(x - 1)$

Ans. [4]

Q.2 In a parallelogram ABCD whose coordinates A(1, 4), B(2, 5) C(4, 3). Then equation of AD is -

(1) $2x - y + 8 = 0$

(2) $x - y + 5 = 0$

(3) $x + y - 3 = 0$

(4) $5x - 7y + 1 = 0$

Ans. [2]

Q.3 If $\det.(ABA^T) = 8$ and $\det.(AB^{-1}) = 8$, then $\det.(BA^{-1}B)$ is equal to -

(1) $\frac{1}{16}$

(2) $\frac{1}{8}$

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

(4) $\frac{1}{32}$

Ans. [1]

Q.4 If two numbers are not equal then their squares are not equal then contrapositive of this statement is -

(1) If two numbers are not equal then their squares are not equal

(2) If the squares are equal then these two numbers are not equal

(3) If the squares are equal then two numbers are equal

(4) If the squares are not equal then two numbers are equal

Ans. [3]

Q.5 Intercept of a circle on x-axis is 2a and it cuts at a point on y-axis which is 2b from origin. Then locus of centre

(1) Ellipse

(2) Parabola

(3) Straight line

(4) Hyperbola

Ans. [2]



Q.6 Length of conjugate axis of a hyperbola is 5 and distance between foci is 13, then eccentricity is -

- (1) $\frac{13}{12}$
- (2) $\frac{12}{5}$
- (3) $\frac{12}{13}$
- (4) 5

Ans. [1]

Q.7 $\lim_{x \rightarrow 0} \frac{x \sin^2 2x}{(\sin^2 x)(\tan 4x)}$ is equal to-

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

Ans. [1]

Q.8 If 19th term of non-zero A.P. is 0. Then the ratio of 49th term to 29th term is -

- (1) 3 : 1
- (2) 2 : 1
- (3) 1 : 3
- (4) 1 : 2

Ans. [1]

Q.9 $f : (0, \infty) \rightarrow [0, \infty), f(x) = \left| 1 - \frac{1}{x} \right|$

- (1) Injective
- (2) Injective and surjective
- (3) Non Injective but surjective
- (4) Neither injective nor surjective

Ans. [3]

Q.10 $(\cot^{-1}x)^2 - 7 \cot^{-1}x + 10 > 0$, then

- (1) $(-\infty, \cot 5) \cup (\cot 2, \cot 4)$
- (2) $(-\infty, \cot 5) \cup (\cot 2, \infty)$
- (3) $(\cot 5, \cot 4)$
- (4) $(\cot 2, \infty)$

Ans. [2]

Q.11 $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \frac{1}{\sin 2x (\tan^5 x + \cot^5 x)} \cdot dx =$

- (1) $\frac{1}{10} \left(\frac{\pi}{4} - \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)^5 \right)$
- (2) $\frac{1}{5} \left(\frac{\pi}{4} - \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)^5 \right)$
- (3) $\frac{1}{2} \left(\frac{\pi}{4} - \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)^5 \right)$
- (4) None

Ans. [1]

Q.12 $f(x) = \frac{x}{\sqrt{x^2 + a^2}} - \frac{d-x}{\sqrt{b^2 + (d-x)^2}}$ is

- (1) $f'(x)$ is continuous
- (2) $f(x)$ is increasing
- (3) $f(x)$ is decreasing
- (4) None of these

Ans. [2]



Q.13 If $(1 + x)^{50} + (1 - x)^{50} = a_0 + a_1x + a_2 x^2 + \dots$ then value of $\frac{a_2}{a_0}$ is -

- (1) 1225
- (2) 1235
- (3) 1245
- (4) 1255

Ans. [1]

Q.14 In ΔABC if $\frac{b+c}{11} = \frac{a+c}{12} = \frac{a+b}{13}$ where a, b, c have usual meaning and $\frac{\cos A}{\alpha} = \frac{\cos B}{\beta} = \frac{\cos C}{\gamma}$, then

(α, β, γ)

- (1) $\alpha : \beta : \gamma = 7 : 19 : 25$
- (2) $\alpha : \beta : \gamma = 19 : 25 : 7$
- (3) $\alpha : \beta : \gamma = 7 : 25 : 19$
- (4) None

Ans. [1]

Q.15 The maximum value of $\frac{x^m y^n}{(1+x^{2m})(1+y^{2n})}$ is -

- (1) $\frac{1}{4}$
- (2) $\frac{6mn}{m+n}$
- (3) $\frac{1}{2}$
- (4) 1

Ans. [1]

Q.16 $\int \frac{x+1}{\sqrt{2x-1}} dx = f(x)\sqrt{2x-1} + c$, then $f(x) =$

- (1) $f(x) = \frac{x+4}{3}$
- (2) $f(x) = \frac{x+3}{4}$
- (3) $f(x) = \frac{x-4}{12}$
- (4) None

Ans. [1]

Q.17 Latus rectum of ellipse is 8 whose major axis is x axis. Distance between focus & length of major axis is equal, then point lie on ellipse is -

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

Ans. [2]

Q.18 $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-b-a \end{vmatrix} = (a+b+c)(x+a+b+c)^2$ then the value of x -

- (1) $-2(a+b+c)$
- (2) $2(a+b+c)$
- (3) abc
- (4) $a+b+c$

Ans. [1]

Q.19 If the equation of curve $y^2 + 4(x - a^2) = 0$ whose one vertex of is the vertex of curve and other two vertices are on y-axis when area of this triangle is 250 square unit. Then a is -

- (1) $5\sqrt{5}$
- (2) $(10)^{\frac{2}{3}}$
- (3) 5
- (4) $5.2^{\frac{1}{3}}$

Ans. [3]



- Q.20** Area bounded by the curve $y = x^2 + 1$ and tangent at the point (2, 5) in the first quadrant is -
(1) $27/26$ (2) $37/24$ (3) $37/12$ (4) $27/13$

Ans. [2]

- Q.21** The function $f(x) = |\sin x| - |x| + |\pi - x| \cos^2 |x|$ is not differentiable in the set is -
(1) $\{\phi\}$ (2) $\{\pi\}$ (3) $\{\pi, 0\}$ (4) $\{0\}$

Ans. [2]

- Q.22** If z is a complex number and $|z| + z = 3 + i$, then modulus of z is

- (1) $\frac{\sqrt{41}}{3}$ (2) $\frac{5}{4}$ (3) $\frac{5}{3}$ (4) $\frac{4}{3}$

Ans. [3]

- Q.23** A plane passes through (2, α , β), (3, 0, 7) and (7, 4, 3) and it is perpendicular to $2x + 5y = 15$, then $(2\alpha - 3\beta)$ is -

- (1) -24 (2) -23 (3) -26 (4) -25

Ans. [3]