Mathematics Sample Paper - 3

Instruction : Attempt any 40 questions out of 50 Duration : 45 Minutes

Q1: Let n(A) = 4 and n(B) = 6. Then, the number of one-one functions from A to B is

(a) 24

(b) 60

(c) 120

(d) 360

Q.2: A relation R from A to B is an arbitrary subset of

(a) A x B

(b) B x A

(c) A x A

(d) B x B

Q.3: Let $A = \{1, 2, 3\}$. Then, number of relations containing (1, 2) and (1, 3) which are reflexive and symmetric but not transitive, is

(a) 1

(b) 2

(c) 3

(d) 4

 $\begin{array}{l} \textbf{Q.4: Let } f:R-\{-\frac{4}{3}\} \rightarrow_{\mathsf{R}} \text{ be a function defined as } f[x] = \frac{4x}{3x+4} \text{ The inverse of } f \text{ is the map g}:\\ \text{range } f \rightarrow R-\{-\frac{4}{3}\} \text{ given by}\\ \text{(a) } g(y) = \frac{3y}{3-4y}\\ \text{(b) } g(y) = \frac{4y}{4-3y}\\ \text{(c) } g(y) = \frac{4y}{3-4y}\\ \text{(c) } g(y) = \frac{4y}{3-4y}\\ \text{(d) } g(y) = \frac{3y}{4-3y} \end{array}$

Q.5: The domain in which sine function will be one-one, is (a) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ (b) $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$ (c) $\left[0, \pi\right]$ (d) Both (a) and (b)

Q.6: cosec x is not defined for (a) all integral multiples of $\frac{\pi}{2}$ (b) all integral multiples of π (c) all integral multiples of $\frac{3\pi}{4}$ (d) None of the above **Q.7:** The principal value of $cos^{-1}(\frac{1}{2}) - 2sin^{-1}(-\frac{1}{2})$ is (a) $\frac{\pi}{3}$ (b) $\frac{-\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) $\frac{\pi}{6}$ **Q.8:** The value of $sin^{1}(sin\frac{2\pi}{3})$ is Here, X refers to (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{3}$ (d) 0 **Q.9:** The number of all possible matrices of order 3 x 3 with each entry 0 or 1 is (a) 27 (b) 18 (c) 81 (d) 512 **Q.10:** If A and B are two matrices of the order 3 x m and 3 x n, respectively and m=n, then the

order of the matrix (5A – 2B)is (a) m x 3

- (b) 3 x 3 (c) m x n
- (d) 3 x n

Q.11: Two matrices A = $[a_{ij}]$ and B = $[b_{ij}]$ are said to be equal, if they are of same order and for all i and j (a) $a_{ij} = b_{ji}$ (b) $a_{ij} = b_{ij}$ (c) $a_{ij} = -b_{ij}$ (d) $a_{ij} + b_{ij} = 0$

Q.12: If A is a 3 x 2 matrix, B is a 3 x 3 matrix and C is a 2 x 3 matrix, then the elements in A, B and C are respectively

- (a) 6, 9, 8 (b) 6, 9, 6
- (c) 9, 6, 6
- (d) 6, 6, 9

Q.13: The area of the triangle, whose vertices are (3, 8), (-4, 2) and (5, 1), is

(a) 60 (b) 61

- (c) $\frac{61}{2}$
- (d) 30

Q.14: If each element of a row (or a column) of a determinant is multiplied by a constant k, then its value gets ... A... by k. Here, A refers to

- (a) added
- (b) subtracted
- (c) divided
- (d) multiplied

Q.15: If the value of the $\begin{vmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{vmatrix}$ determinant is positive, then

(a) abc > 1 (b) abc > -8(c) abc < -8(d) abc > -2

Q.16: If , $\triangle = \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix}$ then the cofactor A_{21} is (a) -(hc + fg)(b) fg – hc (c) fg + hc (d) hc – fg

 $f(x) = \begin{cases} 1, \text{if } x \neq 0\\ 2, \text{if } x = 0 \end{cases} \text{ is not continuous at}$ **Q.17:** The function (a) x = 0(b) x = 1(c) x = -1(d) None of these

Q.18: Continuity of a function at a point is entirely dictated by the...A... of the function at that point. Here, A refers to

- (a) limit
- (b) value
- (c) Both (a) and (b)
- (d) None of these

Q.19: A function is said to be differentiable in an interval [a, b], if it is differentiable at every point of [a, b] (a) including a and b

- (b) excluding a and b
- (c) including a but not b
- (d) including b but not a

Q.20: Let b > 1be a real number. Then, logarithm of a to the base b is x, if

(a) $b^{a} = x$ (b) $a^{b} = x$ (c) $b^{x} = a$ (d) None of these

Q.21: The radius of a circle is increasing uniformly at the rate of 3 cm/s. At radius of 10 cm, the area of the circle is increasing at the rate of (a) 20π cm²/ S

- (a) 20π cm²/ S (b) 40π cm²/ S (c) 60π cm²/ S
- (d) 80π cm²/S

Q.22: The function given $f(x) = e^{2x}$ is ...A... on R. Here, A refers to (a) strictly increasing

- (b) strictly decreasing
- (b) strictly decreasing
- (c) neither increasing nor decreasing
- (d) decreasing

Q.23: The function given by $f(x) = x^3 - 3x^2 + 3x - 100$ is

- (a) increasing on R
- (b) decreasing on R
- (c) strictly decreasing on R
- (d) None of these

Q.24: The approximate value of f(2.01), if $f(x) = 4x^2 + 5x + 2$, is

- (a) 28.21
- (b) 18.24
- (c) 21.28
- (d) 29.30

Q.25: If the derivative of a function sec⁻¹x is $\frac{1}{x\sqrt{x^2-1}}$, then the anti-derivative of $\frac{1}{x\sqrt{x^2-1}}$ is (a) sec⁻¹ x (b) sec⁻¹x+C

- (c) 2 sec⁻¹x
- (d) None of these

Q.26: The anti-derivative of [sec x (sec x + tan x)] is
(a) 2sec x + C
(b) tan x + sec x + C
(c) sec² x + sec x tan x + C
(d) None of these

Q.27: The integral of the function $\tan^4 x$ is (a) $\frac{\tan^3 x}{3} - \tan x - x + C$ (b) $\frac{\tan^3 x}{3} + \tan x - x + C$ (c) $\frac{\tan^3 x}{3} - \tan x + x + C$ (d) $\frac{\tan^3 x}{3} + \tan x + x + C$

Q.28: The value of $\frac{1}{\sqrt{7-6x-x^2}}$ is (a) $\log[2x + \sqrt{7-6x-x^2}] + C$ (b) $\frac{1}{2}\log|\frac{x+3}{x-3}| + C$ (c) $\sin^{-1}(\frac{x+3}{4}) + C$ (d) None of the above

Q.29: If the area between $x = y^2$ and x = 4 is divided into two equal parts by the line x = a, then the value of a is (a) $(4)^{1/3}$ (b) $(4)^{4/3}$

- (c) (4)^{2/3}
- (d) None of these

Q.30: Area of the region bounded by the curve $y = \cos x$ between x = 0 and $x = \pi$ is

- (a) 2 sq units
- (b) 4 sq units
- (c) 3 sq units
- (d) 1 sq unit

Q.31: Area (in sq units) lying between the curves $y^2 = 4x$ and y = 2x is (a) $\frac{2}{3}$

- (b) $\frac{1}{3}$ (c) $\frac{1}{4}$
- (d) $\frac{3}{4}$

Q.32: The area of the circle x² + y² = 16 exterior to the parabola y² = 6x is (a) $\frac{4}{3}(4\pi - \sqrt{3})$ sq units (b) $\frac{4}{3}(4\pi + \sqrt{3})$ sq units (c) $\frac{4}{3}(8\pi - \sqrt{3})$ sq units (d) $\frac{4}{3}(8\pi + \sqrt{3})$ sq units **Q.33:** The equation of the form $2\frac{d^2y}{dx^2} + (\frac{dy}{dx})^3 = 0$ is a\an

- (a) cubic equation
- (b) quadratic equation
- (c) ordinary differential equation
- (d) None of the above

Q.34: The equation y = mx + c, where m and c are parameters, represents family of
(a) straight lines
(b) circles
(c) parabola
(d) hyperbola

Q.35: The equation of a curve whose tangent at any point on it different from origin has slope $y + \frac{y}{x}$, is (a) y = ex(b) $y = kx.e^{x}$ (c) y = kx(d) $y = x \cdot e^{x^{2}}$

Q.36: A differential equation of the form $\frac{dy}{dx} = F(x, y)$ is said to be homogeneous, if F(x, y) is a homogeneous function of degree

- (a) 0
- (b) 1
- (c) 2
- (d) 3

Q.37: If two or more vectors are parallel to the same line then they are called

- (a) collinear vectors
- (b) coinitial vectors
- (c) equal vectors
- (d) zero vectors

Q.38: If four points A(3,2,1), B(4, x, 5), C (4,2,-2) and D (6, 5,-1) are coplanar, then the value of x is

- (a) 2
- (b) 3
- (c) 5
- (d) 0

Q.39: In \triangle ABC (fig), which of the following is not true?



(a) AB + BC + CA = O(b) AB + BC - AC = O(c) AB + BC - CA = O(d) AB - CB + CA = O

Q.40: If α, β, γ be the direction angles of a vector and $\cos \alpha = \frac{14}{15}$, $\cos \beta = \frac{1}{3}$, then $\cos \gamma = \dots K$. Here, K refers to (a) $\pm \frac{2}{15}$ (b) $\frac{1}{5}$ (c) $\pm \frac{1}{15}$

(d) None of these

Q.41: The angle between the lines whose direction cosines are given by the equations 31 + m + 5n = 0 and 6mn - 2nl + 5lm=0, is

(a) $\cos^{-1}\left(\frac{1}{\sqrt{6}}\right)$ (b) $\cos^{-1}\left(\frac{1}{3}\right)$ (c) $\cos^{-1}\left(\frac{-1}{6}\right)$ (d) $\cos^{-1}\left(\frac{-2}{3}\right)$

Q.42: The lines
$$\frac{x+3}{-3} = \frac{y-1}{1} = \frac{z-5}{5}$$
 and $\frac{x+1}{-1} = \frac{y-2}{2} = \frac{z-5}{5}$ are

(a) coplanar

(b) non-coplanar

(c) skew

(d) None of these

Q.43: The distance of the plane $r \cdot (\frac{2}{7}\hat{i} + \frac{3}{7}\hat{j} - \frac{6}{7}\hat{k}) = 1$ from the origin is

(a) 1 (b) 7 (c) $\frac{1}{7}$ (d) None of these

Q.44: The conditions $x \ge 0, y \ge 0$ are called (a) restrictions only (b) negative restrictions (c) non-negative restrictions (d) None of these

Q.45: The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5) (15, 15), (0, 20). Let Z = px + qy, where p, q > 0. Then, the condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20), is (a) p = q (b) p = 2q (c) q = 2p (d) q = 3p **Q.46:** A diet is to contain atleast 80 units of vitamin A and 100 units of minerals. Two foods F_1 and F_2 are available. Food F_1 costs \gtrless 4 per unit and food F_2 costs \gtrless 6 per unit. One unit of food F_1 contains 3 units of vitamin A and 4 units of minerals. One unit of food F_2 contains 6 units of vitamin A and 3 units of minerals. Then, the minimum cost for diet that consists of mixture of these two foods and also meets the minimal nutritional requirements, is

(a) ₹ 100

(b) ₹ 105

(c) ₹ 103 (d) ₹ 104

Q.47: One kind of cake requires 200g of flour and 25g of fat and another kind of cake requires 100g of flour and 50g of fat. Then, the maximum number of cakes which can be made from 5kg of flour and 1kg of fat assuming that there is no storage of the other ingredients used in making the cakes, is

(a) ₹ 20

(b) ₹ 10

(c) ₹ 30 (d) ₹ 40

(u) \ +0

Q.48: Let A and B be two events. If P(A)=0.2, P(B)=0.4 and $P(A \cup B) = 0.6$, then P(A / B) is equal to

(a) 0.8

(b) 0.5

(c) 0.3

(d) 0

Q.49: Two dice are thrown. If it is known that the sum of numbers on the dice was less than 6, the probability of getting a sum 3, is

 $\begin{array}{c} (a) \frac{1}{18} \\ (b) \frac{5}{18} \\ (c) \frac{1}{5} \\ (d) \frac{2}{5} \end{array}$

Q.50: A description giving the values of the random variable along with the corresponding probabilities is called ...K... of the random variable X. Here, K refers to

(a) conditional probability

(b) probability distribution

(c) mean

(d) None of the above

Answer Key : CUET (UG) Mathematics Sample Paper

1. (d)	2. (a)	3. (a)	4. (b)	5. (d)	6. (b)	7. (c)	8. (c)	9. (d)	10. (d)
11. (b)	12. (b)	13. (c)	14. (d)	15. (b)	16. (b)	17. (a)	18. (c)	19. (a)	20. (c)
21. (d)	22. (a)	23. (a)	24. (a)	25. (b)	26. (b)	27. (c)	28. (c)	29. (c)	30. (a)
31. (b)	32. (c)	33. (c)	34. (a)	35. (b)	36. (a)	37. (a)	38. (c)	39. (c)	40. (a)
41. (c)	42. (a)	43. (a)	44. (c)	45. (d)	46. (d)	47. (c)	48. (d)	49. (c)	50. (b)