

CUET 2025 Paper 3

1. The function $f(x) = \frac{-3}{4}x^4 - 8x^3 - \frac{45}{2}x^2 + 163$ has a local maxima at:

- (1) $x = 0$ and $x = 3$ (3) $x = 0$ and $x = -5$
 (2) $x = -3$ and $x = -5$ (4) $x = -3$

2. Let $x = t^2, y = t^3$. Then $\frac{d^2y}{dx^2}$ is equal to:

- (1) $\frac{3}{2}$ (3) $3t$
 (2) $\frac{3}{4t}$ (4) $\frac{3t}{4}$

3. The function $f(x) = x^2e^{-2x}$ increases on

- (1) $(-\infty, \infty)$ (3) $(-\infty, 0) \cup (1, \infty)$
 (2) $(0, 1)$ (4) $(1, \infty)$

4. Area (in sq. units) of the region bounded by the curve $y^2 = 4x$, y -axis and the line $y = 3$ is

- (1) $\frac{9}{4}$ (3) 3
 (2) 2 (4) $\frac{9}{2}$

5.

$$\int \frac{x}{(x-1)(x-2)} dx$$

is equal to (where C is a constant of integration)

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

6. If A is a square matrix and I is an identity matrix of same order such that $A^2 = A$, then $(1 + A)^3 - 8I$ is equal to

- (1) A (3) $7(A - I)$
 (2) $A - I$ (4) I

7. If a matrix has 8 elements then the possible order(s) it may have

- (A) 8×1 (B) 5×3 (C) 6×2 (D) 2×4

Choose the correct answer from the options given below.

- (1) (A) and (D) only (3) (A) only
 (2) (B) and (C) only (4) (A), (B), (C) and (D)

8. The solution of the differential equation $\frac{dr}{dt} = -rt, r(0) = r_0$ is:

- (1) $r = r_0e^{t^2/2}$ (3) $r = r_0e^{-t^2/2}$
 (2) $r = -r_0e^{-t^2/2}$ (4) $r = -r_0e^{-t^2/2}$

9. The corner points of the bounded feasible region determined by the system of linear inequalities are (0,0), (4,0), (2,4) and (0,5). If maximum value of $z = ax + by$, where $a, b > 0$, occurs at both (2,4) and (4,0) then

- (1) $a = 2b$ (3) $a = b$
 (2) $2a = b$ (4) $3a = b$

10. Let A be a non-singular square matrix of order 3 and $|\text{adj } A| = 5$ then $|A|$ is equal to

- (1) $\pm\sqrt{5}$ (3) 25
 (2) 5 (4) 125

11. Match List-I with List-II

List-I	List-II
Differential Equation	Degree
(A) $xy \left(\frac{d^2y}{dx^2}\right) + x \left(\frac{dy}{dx}\right)^2 - y \frac{dy}{dx} = 0$	(I) 3
(B) $\frac{d^2y}{dx^2} + \log \left(\frac{dy}{dx}\right) = 0$	(II) 1
(C) $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^3 + \frac{dy}{dx} + 1 = 0$	(III) not defined
(D) $2x^2 \left(\frac{d^2y}{dx^2}\right)^3 - 5 \left(\frac{dy}{dx}\right)^2 + y = 0$	(IV) 2

Choose the **correct** answer from the options given below:

- (1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV) (3) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
 (2) (A) - (II), (B) - (III), (C) - (IV), (D) - (I) (4) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

12. The minimum value of $z = 2x + y$ subjected to $x + y \geq 10, 2x + 3y \leq 26, x, y \geq 0$ is

- (1) 14 (3) 26
 (2) 20 (4) 30

13. If $A = \begin{bmatrix} a & a & a \\ 0 & a & a \\ 0 & 0 & a \end{bmatrix}$, then $|\text{adj } A|$ is equal to

- (1) a^3 (3) a^9
 (2) a^6 (4) a^{27}

14. Let X denotes the number of doublets obtained in 3 throws of a pair of dice.

Match List-I with List-II

List-I	List-II
(A) $P(X = 0)$	(I) $\frac{1}{216}$
(B) $P(X = 1)$	(II) $\frac{15}{216}$
(C) $P(X = 2)$	(III) $\frac{75}{216}$
(D) $P(X = 3)$	(IV) $\frac{125}{216}$

Choose the correct answer from the options given below:

- (1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV) (3) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
 (2) (A) - (IV), (B) - (II), (C) - (III), (D) - (I) (4) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

15.

$$\int_0^1 xe^x dx \text{ is equal to}$$

- (1) 0 (3) e
 (2) 1 (4) e²

16. The corner points of the feasible region determined by a system of linear constraints are (0, 0), (0, 40), (20, 40), (60, 20), (60, 0). If the objective function is $Z = 4x + 3y$, then which one of the following is true?

- (1) Max $Z > 400$ (3) Max $Z = 400$
 (2) Max $Z < 400$ (4) Max $Z = 350$

17.

$$\begin{bmatrix} 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0,$$

then value of x is

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

18. The area (in sq. units) of the region bounded by the curve $y = \sqrt{16 - x^2}$ and x -axis is

- (1) 8π (3) 24π
 (2) 16π (4) 32π

19. Match List-I with List-II

List-I	List-II
(A) Equations of line through (5, -4, 6) with direction ratios 3, 7, 2	(I) $\frac{x+3}{5} = \frac{y+7}{-4} = \frac{z+2}{6}$
(B) Equations of line through (3, 7, 2) with direction ratios 5, -4, 6	(II) $\frac{x-3}{5} = \frac{y-7}{-4} = \frac{z-2}{6}$
(C) Equations of line through (-5, 4, -6) with direction ratios 3, 7, 2	(III) $\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$
(D) Equations of line through (-3, -7, -2) with direction ratios 5, -4, 6	(IV) $\frac{x+5}{3} = \frac{y-4}{7} = \frac{z+6}{2}$

Choose the correct answer from the options given below:

- (1) (A) - (III), (B) - (II), (C) - (IV), (D) - (I) (3) (A) - (IV), (B) - (I), (C) - (III), (D) - (II)
 (2) (A) - (III), (B) - (II), (C) - (I), (D) - (IV) (4) (A) - (I), (B) - (IV), (C) - (II), (D) - (III)

20. Consider the LPP: Max $Z = 5x + 3y$ subject to $3x + 5y \leq 15, 5x + 2y \leq 10, x \geq 0, y \geq 0$

Match List-I with List-II

List-I	List-II
(A) Objective function	(I) $3x + 5y \geq 15$
(B) One constraint	(II) $x, y \geq 0$
(C) Non-negative restrictions	(III) $Z = 5x + 3y$
(D) Point (1, 2) does not lie in the region	(IV) $3x + 5y \leq 15$

Choose the correct answer from the options given below:

- (1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV) (3) (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
 (2) (A) - (III), (B) - (IV), (C) - (II), (D) - (I) (4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

21. If a line makes angle $\pi/3$ and $\pi/4$ with the positive directions of x -axis and y -axis respectively, then the acute angle made by the line with positive direction of z -axis is

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

22. Let $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$ and $\vec{b} = -2\hat{i} + 3\hat{j} - 4\hat{k}$. Then which of the following statements are correct?

- (A) $|\vec{a}| = \sqrt{14}$
 (B) $|\vec{b}| = 29$
 (C) $\vec{a} \cdot \vec{b} = 8$
 (D) Angle between \vec{a} and \vec{b} is $\cos^{-1}\left(\frac{-8}{\sqrt{406}}\right)$

Choose the **correct** answer from the options given below:

- (1) (A) and (D) only (3) (B), (C) and (D) only
 (2) (A) and (C) only (4) (A), (C) and (D) only

23. Probability that a man speaks truth is $\frac{3}{4}$. He throws a die and reports that it is a six. The probability that it is actually a six is

- (1) $\frac{1}{3}$ (3) $\frac{5}{8}$
 (2) $\frac{3}{8}$ (4) $\frac{2}{3}$

24. The rate of change of volume of a sphere with respect to its surface area, when radius is 4 cm, is equal to

- (1) $64\pi \text{ cm}^3/\text{cm}^2$ (3) $\frac{1}{2} \text{ cm}^3/\text{cm}^2$
 (2) $32\pi \text{ cm}^3/\text{cm}^2$ (4) $2 \text{ cm}^3/\text{cm}^2$

25. Let A be a square matrix of order n , then which of the following are TRUE?

- (A) $|\text{adj } A| = |A|^{n-1}$ (D) $|kA| = k|A|$
 (B) $|A \cdot \text{adj } A| = |A|^n$
 (C) $A \cdot (\text{adj } A) = |A|$ (E) $|A^{-1}| = \frac{1}{|A|}, |A| \neq 0$

Choose the correct answer from the options given below:

- (1) (A), (B) and (E) only (3) (B), (C) and (D) only
 (2) (A), (B), (C) and (E) only (4) (C), (D) and (E) only

26. The minimum value of the function $f(x) = 3 \sin x - 4 \cos x, x \in [-4\pi, 4\pi]$ is equal to

- (1) 0 (3) -5
 (2) -4 (4) -7

27. Which of the following statements is/are true?

(A) The vector sum of the three sides of a triangle in order is $\vec{0}$

(B) The magnitude (r), direction ratios (a, b, c) and direction cosines (l, m, n) of any vector $\vec{r} = a\hat{i} + b\hat{j} + c\hat{k}$ are related as

$$l = \frac{a}{r}, m = \frac{b}{r}, n = \frac{c}{r}$$

(C) If θ is the angle between two vectors \vec{a} and \vec{b} , then their cross product is given as

$$\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \sin \theta$$

(D) The cross product of two vectors is commutative

Choose the correct answer from the options given below:

(1) (A), (B) and (C) only

(3) (A) and (B) only

(2) (B), (C) and (D) only

(4) (C) and (D) only

28. Let $A = \begin{bmatrix} 152 & 105 & 3 \\ 149 & 25 & 35 \\ 2 & 1 & 0 \end{bmatrix}$

If A_{ij} denotes the co-factor of an element a_{ij} of the matrix A , then the value of $a_{11}A_{21} + a_{12}A_{22} + a_{13}A_{23}$ is equal to

(1) -1

(3) 1

(2) 0

(4) 1529

29. Which of the following statements is/are true?

(A) $(\tan^{-1} y - x)dy = (1 + y^2)dx$ is a differential equation where variables are separable.

(B) $(1 + x^2)dy + 2xydx = \cot x dx (x \neq 0)$ is a first order linear differential equation.

(C) $(4x + 6y + 5)dy - (3y + 2x + 4)dx = 0$ is not a homogeneous differential equation.

(D) $(xy)dx - (x + y^2)dy = 0$ is a homogeneous differential equation.

Choose the correct answer from the options given below:

(1) (A) only

(3) (B) and (D) only

(2) (B) and (C) only

(4) (A), (B), (C) and (D)

30. If $y = \sin^{-1} x + \sin^{-1} \sqrt{1 - x^2}$, $x \in (-1, 0)$, then $\frac{dy}{dx}$ is equal to

(1) 0

(3) $\frac{2}{\sqrt{1-x^2}}$

(2) $\frac{1}{\sqrt{1-x^2}}$

(4) $\frac{-2}{\sqrt{1-x^2}}$

31. If $A = \begin{bmatrix} 0 & 1 & -3 \\ -1 & 0 & 5 \\ 3 & -5 & 0 \end{bmatrix}$, then the value of $|A^{2025}|$ is

(1) 1

(3) -126

(2) 126

(4) 0

32. The number of equivalence relation on the set $\{1, 2, 3\}$ containing $(1, 2)$ and $(2, 1)$ is

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

33. The area (in sq. units) bounded by the curve $y = \cos x$ and x -axis between $x = 0$ and $x = \frac{3\pi}{2}$ is

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

34. Two persons A and B throw a die alternately till one of them gets a six and wins the game. If A begins, then the probabilities of winning of A and B respectively are

- (1) $\frac{1}{6}, \frac{1}{6}$ (3) $\frac{6}{11}, \frac{5}{11}$
 (2) $\frac{2}{3}, \frac{1}{3}$ (4) $\frac{5}{11}, \frac{6}{11}$

35. If \vec{a}, \vec{b} and \vec{c} be vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, $|\vec{a}| = 3$, $|\vec{b}| = 5$ and $|\vec{c}| = 7$, then the angle between \vec{a} and \vec{b} is

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

36. Which of the following functions $f(x)$ are differentiable at $x = 0$?

- (A) $|x|$ (D) $|x + 1|$
 (B) $|x - 1|$ (E) x^2
 (C) $[x]$, where $[t]$ denotes the greatest integer $\leq t$

Choose the **correct** answer from the options given below:

- (1) (A), (B) and (D) only (3) (B), (D) and (E) only
 (2) (B) and (D) only (4) (A), (D) and (E) only

37. The value of $\tan^2(\sec^{-1} 2) + \cot^2(\operatorname{cosec}^{-1} 3)$ is equal to

- (1) 6 (3) 13
 (2) 11 (4) 15

38. A and B are two sets such that $n(A) = 5$ and $n(B) = 7$. The number of one-one functions from A to B is

- (1) 35 (3) 2520
 (2) 2150 (4) 120

39. If A is a skew-symmetric matrix, then which of the following statements is **NOT** true?

- (A) A is singular if order of A is odd (D) A^{2025} is a symmetric matrix
 (B) A is non-singular
 (C) A^{2025} is a skew-symmetric matrix (E) all diagonal elements of A are zeros

Choose the **correct** answer from the options given below:

- (1) (A), (C) and (E) only
 (2) (A) and (E) only
 (3) (B), (D) and (E) only
 (4) (B) and (D) only

40. If the lines $\frac{1-x}{3} = \frac{y-2}{2\alpha} = \frac{z-3}{2}$ and $\frac{x-1}{3\alpha} = \frac{y-1}{1} = \frac{6-z}{5}$ are perpendicular, then α is equal to

- (1) $\frac{10}{11}$
 (2) $-\frac{10}{7}$
 (3) $-\frac{10}{11}$
 (4) $\frac{10}{7}$

41.

$$\int \frac{dx}{2 \sin^2 x + 5 \cos^2 x} \text{ is equal to}$$

- (1) $\frac{1}{\sqrt{10}} \tan^{-1} \left(\frac{\tan x}{\sqrt{5}} \right) + C$, C is an arbitrary constant
 (2) $\frac{1}{\sqrt{5}} \tan^{-1} \left(\frac{2 \tan x}{\sqrt{5}} \right) + C$, C is an arbitrary constant
 (3) $\frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{\sqrt{2} \tan x}{\sqrt{5}} \right) + C$, C is an arbitrary constant
 (4) $\frac{1}{\sqrt{10}} \tan^{-1} \left(\frac{\sqrt{2} \tan x}{\sqrt{5}} \right) + C$, C is an arbitrary constant

42. The value(s) of k , for which the system of linear equations $2x + y + z = 1$, $x + ky - z = \frac{3}{2}$ and $3y - 5z = 9$ does not possess a unique solution is

- (1) $k = \frac{7}{5}$
 (2) $k = -\frac{7}{5}$
 (3) $k \in \mathbb{R} - \left\{ \frac{7}{5} \right\}$
 (4) $k \in \mathbb{R} - \left\{ -\frac{7}{5} \right\}$

43. If E and F are independent events associated with an experiment, then which one of the following statements is correct?

- (1) $P(E \cap F) = 0$
 (2) $P(E \cup F) = 1$
 (3) $P(E | F) = P(F)$
 (4) $P(E | F) = P(F)$

44.

$$\int \left(\frac{1}{\log_e x} + \frac{1}{(\log_e x)^2} \right) dx$$

is equal to

- (1) $\frac{x}{\log_e x} + c$; c is an arbitrary constant
 (2) $\frac{1}{\log_e x} + c$; c is an arbitrary constant
 (3) $\frac{x}{(\log_e x)^2} + c$; c is an arbitrary constant
 (4) $\frac{\log_e x}{x} + c$; c is an arbitrary constant

45. Let $\vec{a} = i + j + \hat{k}$ and $\vec{b} = i + 2j + 3\hat{k}$, then a unit vector perpendicular to both vectors $(\vec{a} + \vec{b})$ and $(\vec{a} - \vec{b})$ is equal to

- (1) $\frac{1}{\sqrt{6}}(-\hat{i} + 2\hat{j} - \hat{k})$
 (2) $\frac{1}{\sqrt{6}}(\hat{i} - 2\hat{j} - \hat{k})$
 (3) $\frac{1}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k})$
 (4) $\frac{1}{\sqrt{6}}(\hat{i} + 2\hat{j} + \hat{k})$

46. If $f(a-x) = f(x)$, then $\int_0^a x f(x) dx$ is equal to

- (1) $\frac{a}{2} \int_0^a f(x)dx$ (3) $af(a)$
 (2) $2 \int_0^a f(x)dx$ (4) $a \int_0^a f(x)dx$

47. The function $f(x) = \log_e(\sin x), x \in (0, \pi)$ is

- (A) strictly increasing on $(0, \frac{\pi}{2})$ (D) strictly decreasing on $(\frac{\pi}{2}, \pi)$
 (B) strictly decreasing on $(0, \frac{\pi}{2})$
 (C) strictly increasing on $(\frac{\pi}{2}, \pi)$ (E) strictly increasing on $(0, \pi)$

Choose the correct answer from the options given below:

- (1) (A) and (D) only (3) (A), (D) and (E) only
 (2) (B) and (C) only (4) (B), (D) and (E) only

48. Let $[t]$ denote the greatest integer $\leq t$ and $aZ = \{ax : x \in Z, a \in R\}$ (where Z is set of integer and R is set of real number). The set of points of discontinuity of the function $f(x) = [2x]$ is given by

- (1) Z (3) $\frac{1}{2}Z$
 (2) $2Z$ (4) $R - Z$

49. The solution of the differential equation $\frac{dy}{dx} - \frac{y}{x} = 2 \log_e x$

- (1) $y = x \log_e x + C$; C is an arbitrary constant (3) $y = x((\log_e x)^2 + C)$; C is an arbitrary constant
 (2) $y = x(\log_e x + C)$; C is an arbitrary constant (4) $y = x(2(\log_e x)^2 + C)$; C is an arbitrary constant

50. Consider two independent events A and B such that $P(A) = 0.3, P(B) = 0.6$.

Match List-I with List-II

List-I	List-II
(A) P(A and B)	(I) 0.28
(B) P(A and not B)	(II) 0.18
(C) P(A or B)	(III) 0.12
(D) P(neither A nor B)	(IV) 0.72

Choose the correct answer from the options given below:

- (1) (A) - (IV), (B) - (I), (C) - (II), (D) - (III) (3) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
 (2) (A) - (I), (B) - (II), (C) - (III), (D) - (IV) (4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)