

# CUET 2026 May 21 Mathematics Shift 2

## Question Paper (Memory-Based)

Conducted by National Testing Agency (NTA)



### General Instructions

- ( The examination will be conducted in Computer-Based Test (CBT) mode.
- ( Each question carries +5 marks for correct answer and -1 mark for wrong answer.
- ( The total number of questions are 50.
- ( Duration of the exam is 1 hour (60 minutes).

1. Find the shortest distance between the two skew lines whose vector equations are given by:

$$\vec{r} = (\hat{i} + 2\hat{j} + 3\hat{k}) + \lambda(\hat{i} - 3\hat{j} + 2\hat{k})$$

$$\vec{r} = (4\hat{i} + 5\hat{j} + 6\hat{k}) + \mu(2\hat{i} + 3\hat{j} + \hat{k})$$

- (A)  $3\sqrt{19}$
- (B) 0
- (C) 9
- (D)  $\sqrt{151}$

2. Evaluate the definite integral using standard definite integral properties:

$$\int_0^{\frac{\pi}{2}} \frac{\sin^5 x}{\sin^5 x + \cos^5 x} dx$$

- (A)  $\frac{\pi}{4}$
- (B)  $\frac{\pi}{2}$
- (C)  $\pi$
- (D) 0

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3. If  $A$  is a skew-symmetric matrix of order  $5 \times 5$ , what is the value of its determinant  $|A|$ ?

- (A) 0
  - (B) 1
  - (C)  $-1$
  - (D) 5
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4. Two independent events  $A$  and  $B$  have individual probabilities of occurring given by  $P(A) = 0.4$  and  $P(B) = 0.5$ . Find the probability that at least one of these two events occurs.

- (A) 0.70
  - (B) 0.90
  - (C) 0.20
  - (D) 0.30
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5. Find the general solution of the following homogeneous differential equation:

$$\frac{dy}{dx} = \frac{x^2 + y^2}{xy}$$

- (A)  $y^2 = 2x^2 \ln|x| + Cx^2$
  - (B)  $y = x \ln|x| + C$
  - (C)  $y^2 = x^2 + C$
  - (D)  $y = e^x + Cx$
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6. Find the angle  $\theta$  between the line  $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z-3}{2}$  and the plane  $2x - y + 2z = 7$ .

- (A)  $\sin^{-1}\left(\frac{8}{9}\right)$
  - (B)  $\cos^{-1}\left(\frac{8}{9}\right)$
  - (C)  $\frac{\pi}{2}$
  - (D)  $\sin^{-1}\left(\frac{2}{3}\right)$
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7. Let a relation  $R$  be defined on the set of all natural numbers  $\mathbb{N}$  by the rule:  $(a, b) \in R$  if and only if  $a + b$  is an even number. This relation  $R$  is classified as an:

- (A) Equivalence Relation
  - (B) Symmetric but not Transitive Relation
  - (C) Reflexive but not Symmetric Relation
  - (D) Anti-symmetric Relation
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**8. Find the total area of the bounded region enclosed between the parabola curve  $y^2 = 8x$  and its vertical latus rectum boundary line.**

- (A)  $\frac{32}{3}$  square units
  - (B)  $\frac{16}{3}$  square units
  - (C) 8 square units
  - (D)  $\frac{64}{3}$  square units
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**9. If the direction vectors of two straight lines are given by  $\vec{m} = \hat{i} + \hat{j} + 0\hat{k}$  and  $\vec{n} = \hat{i} + 0\hat{j} + \hat{k}$ , calculate the value of  $\cos \phi$  representing the acute angle between them.**

- (A)  $\frac{1}{2}$
  - (B)  $\frac{\sqrt{3}}{2}$
  - (C) 0
  - (D) 1
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**10. A pair of standard unbiased six-sided dice are rolled simultaneously. Given that the sum of the numbers showing is exactly 6, what is the conditional probability that one of the dice shows the number 2?**

- (A)  $\frac{2}{5}$
  - (B)  $\frac{1}{5}$
  - (C)  $\frac{1}{6}$
  - (D)  $\frac{2}{36}$
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