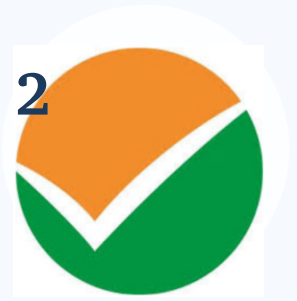


# CUET 2026 May 20 Mathematics Shift 2

## Question Paper (Memory-Based)

Conducted by National Testing Agency (NTA)



### General Instructions

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

1. Find the integrating factor (I.F.) for the linear differential equation:

$$\frac{dy}{dx} + \frac{2x}{1+x^2}y = \frac{1}{(1+x^2)^2}$$

- (A)  $1+x^2$
- (B)  $\ln(1+x^2)$
- (C)  $\frac{1}{1+x^2}$
- (D)  $e^{x^2}$

2. Determine the sum of the order and the degree of the following differential equation:

$$\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = k \frac{d^2y}{dx^2}$$

- (A) 4
- (B) 3
- (C) 5
- (D) The degree is undefined.

3. Find the area of the region enclosed by the ellipse given parametrically by the coordinates

$x = 2 \sin \theta$  and  $y = 3 \cos \theta$  where  $0 \leq \theta \leq 2\pi$ .

- (A)  $6\pi$
  - (B)  $12\pi$
  - (C)  $5\pi$
  - (D)  $13\pi$
- 

4. Evaluate the indefinite integral using pattern-based substitution:

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

- (A)  $\frac{x}{\ln x} + C$
  - (B)  $x \ln x + C$
  - (C)  $\frac{\ln x}{x} + C$
  - (D)  $\frac{1}{\ln x} + C$
- 

5. If  $A$  is a square matrix of order 3 such that its determinant value is  $|A| = -2$ , find the value of the scalar-scaled determinant  $|4A|$ .

- (A)  $-128$
  - (B)  $-8$
  - (C)  $-24$
  - (D)  $128$
- 

6. Find the general solution of the separable differential equation:

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

- (A)  $e^y = e^x + \frac{x^3}{3} + C$
  - (B)  $e^{-y} = e^x + x^3 + C$
  - (C)  $e^y = e^x + 2x + C$
  - (D)  $y = \ln\left(e^x + \frac{x^3}{3}\right) + C$
- 

7. Let  $A$  be a square matrix of order 3 such that  $|A| = 5$ . Find the value of the determinant of its adjoint matrix,  $|\text{adj}(A)|$ .

- (A) 25
  - (B) 5
  - (C) 125
  - (D) 15
- 

**8. In a Linear Programming Problem (LPP), if the objective function to maximize is  $Z = 3x + 4y$  and the corner points of the feasible bounded region are  $(0, 0)$ ,  $(4, 0)$ ,  $(2, 3)$ , and  $(0, 4)$ , find the maximum value of  $Z$ .**

- (A) 18
  - (B) 16
  - (C) 12
  - (D) 22
- 

**9. Find the integrating factor (I.F) for the linear differential equation:**

$$\frac{dy}{dx} - y \tan x = e^x$$

- (A)  $\cos x$
  - (B)  $\sec x$
  - (C)  $-\cos x$
  - (D)  $\ln |\cos x|$
- 

**10. Find the particular solution of the differential equation  $\frac{dy}{dx} = \frac{y}{x}$  given the initial boundary condition that  $y = 2$  when  $x = 1$ .**

- (A)  $y = 2x$
  - (B)  $y = x + 1$
  - (C)  $y = x^2$
  - (D)  $y = \frac{2}{x}$
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