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}

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

$$\left[1+\left(\frac{dy}{dx}\right)^2\right]^{frac32} = k\frac{d^2y}{dx^2}$$

(A) 4

(B) 3

(C) 5

(D) The degree is undefined.

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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** $0 \le \theta \le 2\pi$**.**

(A) 6π

(B) 12π

(C) 5π

(D) 13π

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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) $\frac{1}{\ln x} + C$

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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

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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) $y = \ln\left(e^x + \frac{x^3}{3}\right) + C$

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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

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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

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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) $\ln|\cos x|$

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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) $y = \frac{2}{x}$
