

7201

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

COMMON – THIRD SEMESTER COMMON EXAMINATION

ENGINEERING MATHEMATICS-II

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **three** marks.

1. Evaluate $\int (x^3 + 3x + 2) dx$.
2. Find $\int \frac{1}{\sqrt{9-x^2}} dx$.
3. Find $\int \frac{1}{x \log x} dx$.
4. Evaluate $\int \sqrt{1 + \cos 2\theta} d\theta$.
5. Evaluate $\int_0^1 (x^5 + 1) dx$.
6. Find the mean value of $2x + 1$ in the interval $[2, 6]$.
7. Find the area of the region bounded by the curve $y = \cos x$ between $x = 0$ and $x = \frac{\pi}{2}$.

8. Find the order and degree of the differential equation

$$(x^2 + 1) \frac{dy}{dx} + 2xy = 4x^2.$$

9. Solve $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$.

10. Solve $\frac{dy}{dx} + \frac{y}{x} = 0$.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.
(2) Each question carries **eight** marks.

11. (a) Evaluate $\int \frac{2x-1}{x^2-x+1} dx$.

(OR)

(b) Evaluate $\int \frac{1}{5+4\cos x} dx$.

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12. (a) Evaluate $\int \cos^3 \theta \sin^6 \theta d\theta$.

(OR)

(b) Evaluate $\int x^2 e^{3x} dx$.

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13. (a) Evaluate $\int_0^1 \frac{x^3}{1+x^8} dx$.

(OR)

(b) Show that $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx = \frac{\pi}{4}$.

14. (a) Find the enclosed area between the curve $y = x^2$ and the straight line $y = 3x + 4$.

(OR)

(b) Find the RMS value of \sqrt{x} over the range $x = 1$ and $x = 3$.

15. (a) Find the volume generated by the revolution of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ about x -axis.

(OR)

(b) Evaluate $\int_0^1 x^2 dx$ approximately by dividing the interval (0, 1) into 10 equal sub-interval using Simpson's rule.

PART—C

10×1=10

Instructions : (1) Answer the following question.
(2) The question carries **ten** marks.

16. Solve $(6x^2 + 4xy + 5y^2)dx + (10xy + 2x^2 + 3y^2)dy = 0$.

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