



C20-CHOT-M-301

7256

BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 2022

DME - THIRD SEMESTER 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 $\int (\cos x - \sin x) dx$

2. Evaluate $\int (3x - 5)^7 dx$

3. Evaluate $\int \frac{1}{x(\log x)^2} dx$

4. Evaluate $\int x e^{-x} dx$

5. Evaluate $\int_0^{\frac{\pi}{4}} \sec^2 x dx$

6. Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 x dx$

7. Find the mean value of $y = x^2$ in the interval $[2,3]$.

8. Form the differential equation by eliminating the arbitrary constants A and B from the equation $y = Ae^x + Be^{-x}$.
9. Solve $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$
10. Show that the differential equation $(y^2 - 2xy)dx - (x^2 - 2xy)dy = 0$ is exact.

PART—B

8×5=40

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

11. (a) Evaluate $\int \sin^4 x \cos^3 x dx$

(OR)

(b) Evaluate $\int \frac{x}{x^2 + x - 20} dx$

12. (a) Evaluate $\int \frac{1}{5 + 4 \sin x} dx$

(OR)

(b) Evaluate $\int x^3 \sin 5x dx$

13. (a) Evaluate $\int_0^1 \frac{5x^3}{\sqrt{1-x^8}} dx$

(OR)

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cos x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$

14. (a) Find the area enclosed between the parabolas $y^2 = x$ and $x^2 = y$.

(OR)

- (b) Find the RMS value of $f(x) = \sqrt{27 - x^2}$ in the interval $[0, 3]$.

15. (a) Find the volume of the solid generated by revolving the portion of the parabola $y^2 = 4ax$ cut off by its latus rectum about the x -axis.

(OR)

- (b) Approximate the area under the curve $y = \frac{1}{x}$ between $x = 1$ and $x = 5$ using the trapezoidal rule with $n = 4$ sub-intervals.

PART—C

10×1=10

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

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

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