

*



C20-AE-CM-301

7224

BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 2022

DAE - 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 $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right) dx$

2. Evaluate $\int e^{5x+3} dx$

3. Evaluate $\int \frac{\sin(\log x)}{x} dx$

4. Evaluate $\int e^x (x^2 + 2x) dx$

5. Evaluate $\int_0^3 \frac{2}{2x+3} dx$

6. Evaluate $\int_{-1}^1 x dx$

7. Find the mean value of the function $f(x) = \sin$ over the range $[0, \pi]$.

8. Find the differential equation of all straight lines passing through the origin.

*

9. Solve $(1 + y^2) dx + (1 + x^2) dy = 0$

10. Solve $\frac{dy}{dx} + \frac{y}{x} = 1$

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

11. (a) Evaluate $\int \tan^2 x \sec^4 x dx$

(OR)

(b) Evaluate $\int \frac{x^2}{(x+1)(x+2)^2} dx$

12. (a) Evaluate $\int \frac{1}{3+2\cos x} dx$

(OR)

(b) Evaluate $\int \log x dx$

13. (a) Evaluate $\int_0^{\frac{\pi}{4}} \cos 3x \cos 5x dx$

(OR)

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$

*

14. (a) Compute the area of the region bounded by the parabola $y = x^2$ and the straight line $y = 2x$.

(OR)

- (b) Find the RMS value of $f(x) = \sqrt{\log x}$ over the range $x = 1$ to $x = e$.

15. (a) Find the volume of the solid of revolution bounded by the circle $x^2 + y^2 = 36$ and the lines $x = 0$, $x = 4$ about the x -axis.

(OR)

- (b) Obtain the value of $\int_0^1 \frac{1}{1+x^2} dx$ using Simpson's $\frac{1}{3}$ rd rule by dividing the interval $[0,1]$ into 4 equal parts and hence find the approximate value of π .

PART—C

10×1=10

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

16. Solve $(x^2 + y^2)dx - 2xy dy = 0$

★ ★ ★

*