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C20-C-CM–301

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DCE–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 $\int (x^7 - \frac{3}{x} + \sin x)\,dx$

2. Evaluate $\int \frac{\cos(\log x)}{x}\,dx$

3. Evaluate $\int \sin 8x \cos 3x\,dx$

4. Evaluate $\int x^3 e^{2x}\,dx$

5. Evaluate $\int_0^1 \frac{1}{1+x^2}\,dx$

6. Find the mean value of $y = x^3 + x$ between $x = 0$ and $x = 1$.

7. Find the area bounded by the curve $y = x^2$, X-axis between $x = 1$ and $x = 2$.

8. Find the differential equation of the family of curves $y = A\cos x + B\sin x$, where A and B are arbitrary constants.

9. Solve $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$

10. Solve $x^4 dx + y^4 dy = 0$

PART—B

8×5=40

Instructions : (1) Answer *any* **five** questions.

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

11. *(a)* Evaluate $\int \frac{1}{4+5\cos x}\, dx$

(OR)

(b) Evaluate $\int \frac{1}{x^2+4x+13}\, dx$

12. *(a)* Evaluate $\int \sin^4 x \cos^3 x\, dx$

(OR)

(b) Evaluate $\int x \tan^{-1} x\, dx$

13. *(a)* Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\, dx$

(OR)

(b) Show that $\int_{-1}^{1} \log\left(\frac{3-x}{3+x}\right) dx = 0$

14. *(a)* Find the R.M.S value of $\sqrt{27 - 4x^2}$ from $x = 0$ to $x = 3$.

(OR)

(b) Find the area enclosed between the curve $y = x^2$ and the line $2x - y + 3 = 0$.

15. *(a)* Evaluate $\int_0^1 \frac{1}{1+x} dx$ using trapezoidal rule by taking $n = 4$

(OR)

(b) Find the volume generated by the revolution of the ellipse $9x^2 + 25y^2 = 225$ about X-axis.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

16. Solve $(x^2 + y^2)\, dx = 2xy\, dy$.

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