23103

C23-A-AA-C-EE-EEVT-M-MRAC-MET-MNG-TT–301

23103

BOARD DIPLOMA EXAMINATION, (C-23)

MARCH/APRIL—2026

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 $\int\left(3x^2+e^x\right)dx$

2. Evaluate $\int(3\sec^2 x+2\cos x+5\sin x)dx$.

3. Evaluate $\int\left(\frac{4}{1+x^2}+\operatorname{cosec}^2 x\right)dx$.

4. Evaluate $\int_0^1(x^2+4x+1)dx$.

5. Evaluate $\int_0^1\frac{1}{\sqrt{1-x^2}}dx$.

6. Find the area enclosed by the curve $y=x^2-1$, X-axis and the lines $x=1$ and $x=3$.

7. Find the mean value of $y=x^2$ on $[2,6]$.

8. Find the order and degree of the differential equation $\frac{d^2y}{dx^2} + 4\left(\frac{dy}{dx}\right)^3 + 3y = 0$.

9. Form the differential equation from $y = Ae^{2x} + Be^{-2x}$, where A, B are constants.

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

PART—B

10×5=50

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

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

11. *(a)* Evaluate $\int\left(\cosh x + \frac{3}{4+x^2} + \frac{1}{x} + 2^x\right)dx$.

(b) Evaluate $\int\sqrt{1+\cos 2x}\,dx$.

12. *(a)* Evaluate $\int\frac{1}{x^2+2x+10}dx$.

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

13. *(a)* Evaluate $\int x^2\sin 2x\,dx$.

(b) Evaluate $\int_0^1(x+2)(2x-1)dx$.

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

(b) Find the R.M.S. value of $y = xe^x$ from $x = 0$ to $x = 1$.

15. Find the approximate value of $\int_0^1 1+x^2\,dx$ using trapezoidal rule by taking $n=5$.

16. Solve $\frac{dy}{dx}+y\cot x=\operatorname{cosec} x$.

17. *(a)* Solve $(D^2+9)y=0$.

(b) Solve $(D^2+18D+81)y=0$.

18. Solve $(D^2-5D+6)y=e^{4x}+\sin x$.

★★★