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

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BOARD DIPLOMA EXAMINATION, (C-23)

MARCH/APRIL—2025

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.

(3) Marks will be awarded only for the desired and accurate language/grammatical expressions.

1. Evaluate $\int f(x^3 + 3^x)dx$

2. Evaluate $\int\left(\sinh x + \frac{1}{1+x^2} - \cos x\right)dx$

3. Evaluate $\int\left(\frac{\sec^2 x}{\tan x}\right)dx$

4. Evaluate $\int_0^1 (x+3)(x+1)dx$

5. Evaluate $\int_0^2 \frac{1}{x^2+4}dx$

6. Find the area bounded by the curve $y = x^2 - 5x + 6$, *X*-axis and the lines $x = 2$ and $x = 3$.

7. Find the Mean value of $y = x^3 + 3$ on [0, 1].

8. Find the order and degree of the differential equation $2\frac{d^3y}{dx^3}+\left(\frac{dy}{dx}\right)^2+5y=0$.

9. Form the differential equation from $y = A\sin 3x + B\cos 3x$, where A, B are constants.

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

PART—B

10×5=50

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

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

(3) The criterion for the award of marks is the appropriate content, quality and clarity of expression but not the length of your answer.

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

(b) Evaluate $\int \sin 2x \cdot \cos 3x\, dx$

12. *(a)* Evaluate $\int\left(\frac{1}{x^2+25}\right)dx$

(b) Evaluate $\int \frac{2x+1}{(x+3)(x+3)}\, dx$

13. *(a)* Evaluate $\int x^3 e^x\, dx$

(b) Evaluate $\int_0^{\frac{\pi}{4}} \tan^2 x\, dx$

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

(b) Find the R.M.S. value of $y = \sqrt{8 - x^2}$ on [0,2].

15. Find the approximate value of $\int_0^1 \frac{1}{1+x^2}\,dx$ using Trapezoidal Rule by taking $n = 5$.

16. Solve $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^5}$

17. *(a)* Solve $(D^2 + 25)y = 0$

(b) Solve $(D^2 - 6D + 8)y = 0$

18. Solve $(D^2 - 4D + 3)y = e^{2x} + \cos x$

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