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C20-M/CHOT–301

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DME–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 $\int\left(e^x + \sin x + \frac{1}{x}\right)dx$

2. Evaluate $\int \sec^2(3x-1)\,dx$

3. Evaluate $\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx$

4. Evaluate $\int xe^x\,dx$

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

6. Find the mean value of $x + x^2$ in the interval (2, 6)

7. Find the area of the region bounded by $x^2 = 8y$, $x-axis$ and the lines $x = 1$ and $x = 2$

8. Find the order and degee of the differential equation

$$\left(\frac{d^2y}{dx^2}\right)^2 + 2\frac{d^2y}{dx^2} - 3\left(\frac{dy}{dx}\right)^5 = 0$$

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

10. Find the integrating factor of $\frac{dy}{dx} = y\tan x = \sec x$

PART—B

8×5=40

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

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

11. *(a)* Evaluate $\int \sin^5\theta \cos^3\theta \, d\theta$

(OR)

(b) Evaluate $\int \frac{1}{4-5\cos x} dx$

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

(OR)

(b) Evaluate $\int x^3 e^{5x} dx$

13. *(a)* Evaluate $\int_0^{\frac{\pi}{2}} \sin 5x . \cos 3x \, dx$

(OR)

(b) Prove the $\int_0^{\frac{\pi}{2}} \log \tan x \; dx = 0$

14. *(a)* Find the area bounded between the curves $y = x^2 - x$ and $y = x$

(OR)

(b) Find the RMS value of $\sqrt{8 + 2x^2}$ from $x = 1$ to $x = 2$

15. *(a)* Find the volume of the solid generated by revolution of the circle $x^2 + y^2 = 9$ about x- axis.

(OR)

(b) Calculate the approximate value of $\int_0^2 x^3 dx$ by taking $n = 5$ using Trapezoidal rule.

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

16. Solve $(3x - y - 1)dx + (5y - x + 3)\,dy = 0$

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