7201

BOARD DIPLOMA EXAMINATION, (C-20)

MAY—2023

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.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Evaluate $\int (3x^3 + 4x^2 - 5x)dx$

2. Evaluate $\int \frac{1}{\sqrt{1}} dx$

3. Evaluate $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

4. Evaluate $\int x \tan x \, dx$

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

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6. Find the mean value of $x^2 + 5$ in (0,5)

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

8. Find the order and degree of the differential equation

$$x^2\left(\frac{d^2y}{dx^2}\right)^3 + 2y\left(\frac{dy}{dx}\right)^4 + y^4 = 0$$

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

10. Find the integrating factor of $\frac{dy}{dx} + 3x^2y = x^2$.

PART—B

8×5=40

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

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

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

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

(OR)

(b) Evaluate $\int \sin^3 x \cos^6 x \, dx$

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

(OR)

(b) Evaluate $\int x^4 e^{2x} \, dx$

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13. *(a)* Evaluate $\int_0^1 x \sin^{-1} x \, dx$

(OR)

(b) Prove that $\int_0^{\frac{\pi}{2}} \frac{\sin^{20} x}{\sin^{20} x + \cos^{20} x} dx = \frac{\pi}{4}$

14. *(a)* Find the area bounded by the curves $y^2 = 4x$ and $x^2 = 4y$.

(OR)

(b) Find the RMS value of xe^x from $x = 1$ to $x = 3$.

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

(OR)

(b) Calculate approximate value of $\int_0^1 x^2 \, dx$ by taking $n = 10$ using trapezoidal rule.

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

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

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