C20-EC-CHPC–**301**

7239

BOARD DIPLOMA EXAMINATION, (C-20)
OCTOBER/NOVEMBER—2023
DECE – 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 $\int x^9 + \cos x + e^x \, dx$

2. Evaluate $\int \dfrac{3}{x} + 3^x + x^3 \, dx$

3. Evaluate $\int \dfrac{\sec^2(\log x)}{x} \, dx$

4. Evaluate $\int x^3 \log x \, dx$

5. Evaluate $\int_0^1 (x-2)(x+3) \, dx$

6. Find the area of the region bounded by $y^2 = 4x$ between $x = 0$ and $x = 3$.

7. Find the mean value of $y = x\, e^x$ on $[0, 1]$.

8. Form the differential equation by eliminating the arbitrary constants A, B from the equation $y = A \cos 5x + B \sin 5x$.

9. Solve $\dfrac{dy}{dx} = e^{x-y}$

10. Find the integrating factor of $\dfrac{dy}{dx} + y \cot x = \cos e x$.

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PART—B
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8×5=40

Instructions : (1) Answer **all** questions.

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

11. *(a)* Evaluate $\displaystyle\int \sin^5 x \cdot \cos^3 x \, dx$

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(OR)
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(b) Evaluate $\displaystyle\int \dfrac{1}{x^2 + 8x + 20} \, dx$

12. *(a)* Evaluate $\displaystyle\int \dfrac{x}{(x-7)(x-5)} \, dx$

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

13. *(a)* Evaluate $\displaystyle\int_0^1 x(1-x)^7 \, dx$

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(OR)
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(b) Evaluate $\displaystyle\int_0^{\frac{\pi}{2}} \frac{1}{1+\cot x}\,dx$

14. *(a)* Find the area bounded by $y^2 = 8x$ and the line $2x - y - 8 = 0$.

(OR)

(b) Find the RMS value of $y = x^2 + 2$ on $[0, 2]$.

15. *(a)* Find the volume generated by revolution of $\dfrac{x^2}{64} + \dfrac{y^2}{16} = 1$ about X-axis.

(OR)

(b) Evaluate $\displaystyle\int_1^2 \frac{1}{x}\,dx$ approximately by using Simpson's rule by dividing

[1, 2] into 10 equal parts.

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

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

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