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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DECE - 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.

1. Evaluate $\int (x^9 + 9^x + 9x) dx$.

2. Evaluate $\int \frac{e^{\tan^{-1} x}}{1+x^2} dx$.

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

4. Find the area of the region bounded by the curve $y = x^2 - x + 1$ the x -axis and the ordinates $x = 1$ and $x = 3$.

5. Find $L\{3 \sin 4t - 4 \cos 3t\}$.

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6. Find $L^{-1}\left\{\frac{1}{s-3} + \frac{1}{s} + \frac{s}{s^2-4}\right\}$.
7. Define the Fourier series of $f(x)$ in the interval $(c, c+2\pi)$.
8. Find the differential equation to the family of curves $y = A\cos 3x + B\sin 3x$ where A, B are arbitrary constants.
9. Solve $x dx + y dy = 0$.
10. Solve $(D^2 - 5D + 4)y = 0$.

PART—B

10×5=50

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

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

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

(b) Evaluate $\int \sin 5x \cos 2x dx$

12. (a) Evaluate $\int x^2 e^{5x} dx$

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\tan x}}{\sqrt{\tan x} + \sqrt{\cot x}} dx$

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13. (a) Find the RMS value of \sqrt{x} over the range $x=1$ and $x=3$.
(b) Find the volume of the solid formed by revolving the area enclosed by the curve $x^2 + y^2 = 25$, the X-axis and the lines $x=2$ and $x=3$ about the X-axis.

14. (a) Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Trapezoidal rule by taking number of intervals $n=4$

(b) Find $L\{e^{2t} \sin 3t\}$.

15. (a) Find $L^{-1}\left\{\frac{s-2}{(s+3)(s+2)}\right\}$.

(b) Find $L^{-1}\left\{\frac{s+2}{s^2+4s+13}\right\}$.

16. Find the Fourier series of $f(x) = x^2$ in the interval $(-\pi, \pi)$.

17. (a) Solve : $\frac{dy}{dx} + \frac{y}{x} = 5x$

(b) Solve : $(9x + 5y - 9)dx + (5x + 7y - 4)dy = 0$

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18. (a) Solve : $(D^2 + 1)y = 3 \cos 4x$

(b) Solve : $(D^2 + 2D + 1)y = e^{2x}$

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