



C20-EE-CHPP-PET-401

7444

**BOARD DIPLOMA EXAMINATION, (C-20)
OCTOBER/NOVEMBER—2024
DEEE – FOURTH SEMESTER EXAMINATION
ENGINEERING MATHEMATICS—III**

Time : 3 Hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **three** marks.

1. Solve $(D^2 + D - 6)y = 0$.
2. Solve $(D^2 - 16)y = 0$.
3. Find the particular integral of the differential equation $(D^2 + 3D + 2)y = e^{3x}$.
4. Find the particular integral of the differential equation $(D^2 - 4)y = \sin x$.
5. Find $L\{3e^{2t} + 4e^{-3t}\}$.
6. Find $L\{\sin 2t + \cos h2t\}$.
7. Find $L^{-1}\left\{\frac{1}{s} + \frac{1}{s^2}\right\}$.
8. Write the Euler's formulae for Fourier coefficients of $f(x)$ in $(c, c + 2\pi)$.
9. Find the value of a_0 in the Fourier expansion of $f(x) = x^2$ in $(0, 2\pi)$.
10. Find the value of b_1 in the Fourier expansion of $f(x) = 1$ in $(-\pi, \pi)$.

PART—B

8×5=40

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **eight** marks.

11. (a) Solve $(D^3 - 2D^2 - 3D)y = 0$, where $D \equiv \frac{d}{dx}$.

(OR)

(b) Solve $(D^2 - 7D + 6)y = e^{2x}$, where $D \equiv \frac{d}{dx}$.

12. (a) Solve $(D^2 + D + 1)y = \sin 2x$, where $D \equiv \frac{d}{dx}$.

(OR)

(b) Solve $(D^2 + 36)y = x^2$, where $D \equiv \frac{d}{dx}$.

13. (a) Evaluate $L\{e^{3t}(\sin 3t + \cos 2t)\}$.

(OR)

(b) Evaluate $L\{t \sin 3t\}$.

14. (a) Evaluate $L\left\{\frac{\sin t}{t}\right\}$.

(OR)

(b) Using Laplace Transform, evaluate $\int_0^{\infty} e^{-t} \sin 2t dt$.

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

(OR)

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

PART—C

10×1=10

- Instructions :** (1) Answer the following question.
(2) The question carries **ten** marks.

16. Expand the function $f(x) = x$ as Fourier series in the interval $0 < x < 2\pi$.

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