



C20-EC-CHPC-401

7439

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2024

DECE - 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 $(D^2 - 6D + 9)y = 0$
2. Solve $(D^2 - 4)y = 0$
3. Find the particular integral of the differential equation $(D^2 - 1)y = \sin 2x$.
4. Find the particular integral of the differential equation $(D^2 + D + 4)y = e^x$.
5. Find $L\{\cos 3t + 2\sin 3t\}$.
6. Find $L\{e^{2t} + t + 1\}$.
7. Find $L^{-1}\left\{\frac{1}{s} + \frac{1}{s^2 + 1} + \frac{3s}{s^2 - 9}\right\}$.
8. Write the Euler's formulae for Fourier coefficients of $f(x)$ in $(c, c + 2\pi)$.
9. Find the value of a_1 in the Fourier expansion of $f(x) = 1$ in $(0, 2\pi)$.
10. Find the value of b_1 in the Fourier expansion of $f(x) = k$ in $(-1, 1)$.

PART—B

8×5=40

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

11. (a) Solve $(D^3 - D^2 - 8D + 12)y = 0$, where $D \equiv \frac{d}{dx}$.

(OR)

(b) Solve $(D^2 - 5D + 6)y = e^{4x}$, where $D \equiv \frac{d}{dx}$.

12. (a) Solve $(D^2 + 2D + 1)y = 8\sin x$, where $D \equiv \frac{d}{dx}$.

(OR)

(b) Solve $(D^2 + 3D + 2)y = x$, where $D \equiv \frac{d}{dx}$.

13. (a) Evaluate $L\{e^{2t}(3t^5 - \cos 4t)\}$

(OR)

(b) Evaluate $L\{t \sin at\}$

14. (a) Evaluate $L\left\{\frac{1 - \cos 2t}{t}\right\}$

(OR)

(b) Using Laplace transform, evaluate $\int_0^\infty e^{-4t} \cos 3t dt$

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

(OR)

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

PART—C

10×1=10

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

16. Find half-range Fourier sine and cosine series for $f(x) = x$ in $(0, \pi)$.

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