C20-EE-CHPP-PET–401

7444

BOARD DIPLOMA EXAMINATION, (C-20)

MAY—2023

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.

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

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

2. Solve $(D^2 - 1)y = 0$, where $D \equiv \frac{d}{dx}$.

3. Find the particular integral of the differential equation $(D^2 + 9)y = e^x$.

4. Find the particular integral of the differential equation $(D^2 - 4)y = \cos 4x$.

5. Find $L\{e^{-2t} + e^{2t}\}$

6. Find $L\{2\cos 3t + 3\sin 2t\}$

7. Find $L^{-1}\left\{\frac{3}{s-2} + \frac{4}{s^2+4}\right\}$

8. Write the formulae for Fourier coefficients of $f(x)$ in the interval $(0, 2\pi)$.

9. Find the value of a_0 in the Fourier expansion of $f(x) = e^{ax}$ in $(-\pi, \pi)$.

10. Write the value of b_1 in the Fourier series of $f(x) = \pi$ in $(0, 2\pi)$.

PART—B

8×5=40

Instructions : (1) Answer **all** 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)* Solve $(D^3 - 2D^2 - D + 2)y = 0$, where $D \equiv \frac{d}{dx}$.

(OR)

(b) Solve $(D^2 + 2D - 8)y = e^{-2x}$, where $D \equiv \frac{d}{dx}$.

12. *(a)* Solve $(D^2 - 4D + 4)y = 5\sin 2x$, where $D \equiv \frac{d}{dx}$.

(OR)

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

13. *(a)* Evaluate $L\{e^t(t+1)^2\}$

(OR)

(b) Evaluate $L\{t\cos 4t\}$

14. *(a)* Evaluate $L\left\{\frac{\sin 4t}{t}\right\}$

(OR)

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

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

(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.

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

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

★★★