



C20-A-AA-AEI-BM-CHST-MNG-CH-MET-TT-AMT-AMG-WD-CAI-401

7401

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

COMMON – FOURTH SEMESTER COMMON 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 $(D^2 + 4)y = 0$

2. Solve $(D^2 - 2D + 5)y = 0$

3. Find the particular integral of Differential Equation $(D^2 + D + 1)y = e^{4x}$

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

5. Evaluate $L\{2e^{-3t} + t^3 + 3\sin 4t\}$

6. Evaluate $L\{t^3 e^{-5t}\}$

7. Evaluate $L^{-1}\left\{\frac{2}{(s-1)^3}\right\}$

- * 8. Find the value of " a_0 " in the Fourier expansion of $f(x) = x^2$ in the interval $(0, 2\pi)$.
9. Write the Euler's formula for Fourier series expansion of $f(x)$ in the interval $(c, c + 2l)$.
10. If $f(x) = x^4$ in the interval of $-1 < x < 1$ then, find the value of " b_n " in the Fourier Series expansion.

PART—B

8×5=40

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

11. (a) Solve $(D^3 + D^2 + 4D + 4)y = 0$

(OR)

(b) Solve $(D^2 + 4D + 5)y = 2 \cos h x$

12. (a) Solve $(D^2 - 4)y = 2 \sin^2 x$

(OR)

(b) Solve $(D^2 + 2D + 1)y = 2x + x^2$

* 13. (a) Evaluate $L\{\sin 2t \sin 3t\}$

(OR)

(b) Evaluate $L\{te^{2t} \cos 5t\}$

*
14. (a) Evaluate $L\left\{\frac{\cos 2t - \cos 3t}{t}\right\}$

(OR)

(b) Evaluate $L^{-1}\left\{\frac{20 - 4s}{s^2 - 4s + 20}\right\}$

15. (a) Evaluate $L^{-1}\left\{\log\left(\frac{s+1}{s-1}\right)\right\}$

(OR)

(b) Evaluate $L^{-1}\left\{\frac{1}{s(s^2 - 4)}\right\}$ by using convolution theorem.

PART—C

10×1=10

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

16. Find the Half-range Fourier cosine and sine series for $f(x) = x^2$ in the interval $(-\pi, \pi)$.
