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C20-C-CM-401

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BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DACE – 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  $(D^2 + 1)y = 0$

2. Solve  $(D^2 + 4D + 6)y = 0$

3. Find the particular integral of differential equation  $(D^2 - 4D + 8)y = e^{-x}$ .

\* 4. Find the particular integral of differential equation  $(D^2 - 16)y = \sin 2x$ .

5. Find  $L\{2e^{-7t} + 5t^3 + 2\sinh 2t\}$ .

6. Find  $L\{e^{-t} \cos 2t\}$ .

7. Find  $L^{-1}\left\{\frac{1}{s^2 + 4s + 20}\right\}$ .

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8. Write down the Fourier series expansion of a function  $f(x)$  in the interval  $(-1,1)$ . Give the corresponding formulae for finding the coefficients.
9. Obtain the value of " $b_n$ " in Fourier series expansion of  $f(x) = \cos x$  in the interval  $-\pi < x < \pi$ .
10. Obtain the value of " $a_0$ " in the half range cosine series expansion of  $f(x) = 3x + 1$  in the interval  $0 < x < 2$ .

PART—B

8×5=40

Instructions : (1) Answer either (a) or (b) from each questions from part-B.  
 (2) Each question carries eight marks.

11. (a) Solve  $(D^4 - D^3 - 9D^2 - 11D - 4)Y = 0$

( OR )

(b) Solve  $(D^2 - 3D + 2)y = (e^x + 1)^2$

12. (a) Solve  $(D^2 + 5D - 6)y = \sin 4x \sin x$

( OR )

(b) Solve  $(D^2 + 4)y = x^2 + 3$

13. (a) Find  $L(f(t))$  if  $f(t) = \begin{cases} 1, & 0 < t < 2 \\ 2, & t > 2 \end{cases}$

( OR )

(b) Evaluate  $L\{t(\sin t + \cos t)\}$

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

( OR )

(b) Evaluate  $L^{-1} \left\{ \frac{s+1}{s^2+6s-7} \right\}$

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

( OR )

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

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries ten marks.

16. Find the Fourier series for  $f(x) = x^2$  in the interval  $(0, 2\pi)$ .

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