



C16-M-401

5684

BOARD DIPLOMA EXAMINATION, (C-16)  
MARCH/APRIL—2018  
DME—FOURTH SEMESTER EXAMINATION  
ENGINEERING MATHEMATICS—IV

Time : 3 hours ]

[ Total Marks : 80

PART—A

3×10=30

**Instructions** : (1) Answer **all** questions.

(2) Each question carries **three** marks.

1. Solve  $(D^2 - 2D - 3)y = 0$ .

2. Solve  $(D^2 - D - 1)y = 0$ .

3. Solve  $(D^3 - D^2 - D - 1)y = 0$ .

4. Find the PI of  $(D^2 - 25)y = \sin 5x$ .

5. Find the PI of  $(D^2 - 6D - 9)y = e^{3x}$ .

6. Find  $L(t^3 \cos 3t - e^{3t})$ .

7. Find  $L(e^{2t} \sin 3t)$

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8. Find  $L^{-1} \frac{s}{(s-2)^2}$ .

9. Write the Fourier series for the function  $f(x)$  in the interval  $(C, C+2)$ .

10. Calculate the coefficient  $a_0$  in Fourier series of expansion of  $x$  in  $(0, 2)$ .

**PART—B**

10×5=50

**Instructions** : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

11. (a) Solve  $(D^2 - 2D - 1)y = e^{3x}$ .

(b) Solve  $(D^2 - D - 2)y = \sin 2x$ .

12. (a) Solve  $(D^2 - 1)y = x^2 - 2$ .

(b) Solve  $(D^2 - 6D - 4)y = 4e^{2x}$ .

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

(b) Find  $L(t^3 e^{2t})$ .

14. (a) Find  $L^{-1} \frac{1}{s^2 - 4s}$ .

(b) Find  $L \frac{\sin 4t}{t}$ .

15. (a) <sup>\*</sup> Using convolution theorem, find

$$L^{-1} \frac{1}{s(s^2 - 9)}$$

- (b) Using Laplace transform technique, find  $\int_0^{\infty} e^{-3t} \sin 2t \, dt$ .

16. Using Laplace transform method, solve  $y'' - y = t$ ,  $y(0) = 1$ ,  $y'(0) = 0$ .

17. Develop  $f(x) = |x|$  in a Fourier series when  $x \in (-\pi, \pi)$ . Hence deduce that

$$\frac{1}{1^2} - \frac{1}{3^2} + \frac{1}{5^2} - \dots = \frac{2}{8}$$

18. Obtain the Fourier series for  $f(x) = e^x$  in the interval  $(0, 2\pi)$ .

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