



C14-EE-401/C14-CHPP-401/

C14-PET-401

**4461**

**BOARD DIPLOMA EXAMINATION, (C-14)  
MARCH/APRIL—2018  
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  $(D^2 - 6D + 4)y = 0$ .
2. Solve  $(D^3 - 2D^2 - 3D)y = 0$ .
3. Find the particular integral of  $(D^2 + 4)y = \cos 4x$ .
4. Find  $L(\sin^2 2t)$ .
5. Find  $L(t^3 e^{-5t})$ .
6. Evaluate  $\int_0^{\infty} e^{-4t} \cos 3t dt$
7. Find  $L^{-1}\left(\frac{1}{s(s+2)}\right)$ .
8. Find the Fourier coefficient  $b_n$  for the function  $f(x) = x$  in the interval  $(0, \pi)$ .

9. Write the Fourier series for the function  $f(x)$  defined in the interval  $(c, c + 2\pi)$ . \*
10. A bag contains 5 black, 7 red and 4 white balls. A ball is drawn at random. Find the probability that the ball drawn is white.

**PART—B**

10×5=50

- Instructions :** (1) Answer *any five* questions.  
 (2) Each question carries **ten** marks.  
 (3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. (a) Solve  $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^{3x} \sinh 2x$

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

12. (a) Solve  $(D^2 - 4D + 3)y = x^2$

(b) Find the particular integral of  $(D^2 + D - 2)y = x + \sin x$

13. (a) Find  $L\left(\frac{1 - \cos t}{t}\right)$ .

(b) Find  $\left(\int_0^t te^{-t} \sin t dt\right)$

14. Using Laplace transform method, solve

$Y''' + 2Y'' - Y' - 2Y = 0$  given  $Y(0) = Y'(0) = 0$  and  $Y'''(0) = 6$ .

15. Obtain the Fourier series of  $f(x) = e^{ax}$  in the interval

$-\pi < x < \pi$ .

16. Find the Fourier series of the function  $f(x)$  given by

$f(x) = x - 2$  in the interval 0 to  $2\pi$ .

- 17.** (a) The probability for a contractor to get a road contract is  $\frac{2}{3}$  and to get a building contract is  $\frac{5}{9}$ . The probability to get at least one contract is  $\frac{4}{5}$ . Find the probability that he gets the both the contracts.
- (b) A card is selected at a random from a pack of cards. Let 'A' be the event that card is below 5 and 'B' be the event that the card is heart. Show that A and B are independent events.
- 18.** There are two identical boxes containing respectively 3 blue, 2 red marbles; and 2 blue, 5 red marbles. A marble is drawn at random from one of the boxes turns out to be blue. What is the probability that it came from the first box?

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