



C14-EC-401/C14-CHPC-  
401/C14-PCT-401

**4455**

**BOARD DIPLOMA EXAMINATION, (C-14)  
OCT / NOV-2017  
DECE-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  $(D^2 + 10D + 25)y = 0$
2. Solve  $(D^2 - D - 1)y = 0$
3. Find the particular integral of  $(D^2 + 1)y = \sin 3x$
4. Find  $L(\cos 3t \cdot \sin 4t)$
5. Find  $L(e^{-t} \cos 5t)$
6. If  $Lf(t) = \frac{20 - 4s}{s^2 - 4s + 20}$ , find  $L(f(3t))$
7. Find  $L^{-1}\left(\frac{1}{s^2 - 3s + 2}\right)$
8. Find the value of  $\alpha_0$  in  $f(x) = x + x^2$  in  $(-\pi, \pi)$  by Fourier series.
9. Write the Euler's formulae of Fourier series for a function in  $(-\pi, \pi)$ .
10. Find the probability of getting two kings when two cards are drawn from a pack of cards.

**PART - B**

10 × 5 = 50

- Instructions :** (1) Answer any **five** questions.  
(2) Each question carries **ten** marks.

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

11. a) Solve  $(D^2 - 6D + 9)y = e^{3x} + 1$   
b) Solve  $(D^2 - D + 1)y = \cos 2x$
12. a) Solve  $(D^2 - 25)y = x^4$   
b) Solve  $(D^2 - D - 6)y = x - \sin 3x$
13. a) Find  $L\{te^{-t}\cos 4t\}$   
b) Find  $\int_0^\infty te^{-3t} \sin t \, dt$
14. Using Convolution theorem, find  $L^{-1} \frac{1}{(s^2 + 4)(s^2 + 25)}$
15. Find the Fourier series to represent  $f(x) = \left(\frac{\pi - x}{2}\right)^2$  in the interval  $(0, 2\pi)$ .
16. Express  $f(x) = 3x - 1$  as half-range cosine series in  $0 < x < 2$ .
17. a) A batch of 100 Lamps is known to have 4% defectives. If 10 Lamps are chosen at random, find the probability that (i) none is defective (ii) two are defectives.  
b) The probabilities of a problem being solved by three students are  $\frac{1}{3}, \frac{2}{7}$  and  $\frac{2}{5}$ . Find the probability that the problem will be solved if all of them try independently.
18. Three boxes numbered I, II, III contain 2 white, 1 black and 3 red balls; 2 white, 5 black and 2 red balls; 4 white, 3 black and 1 red balls respectively. One box is randomly selected and a ball is drawn from it. If the ball is white, then find the probability that is from box III.

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