



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

4461

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2016

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  $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = 0$ .

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

3. Find the particular integral of  $(D^2 - 1)y = \cos x$ .

4. Find  $L(e^{2t} - 4t^3 - 3\sin 2t - 2\cos 2t)$ .

5. Find  $L(t \sin 2t)$ .

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

7. Find  $L^{-1} \left[ \frac{2}{s-4} - \frac{3}{s^2-9} \right]$ .
8. Find Fourier sine series of  $K$  in  $(0, \pi)$ , for any constant  $K$ .
9. Write the Dirichlet's condition for the existence of Fourier series of a function in interval  $(C, C+2\pi)$ .
10. Write the probability of getting 53 sundays in a leap year.

**PART—B**

10×5=50

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

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

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

11. Solve  $(D^2 - D - 2)y = \sin x + e^{2x} - 4$ .

12. Solve  $(D^2 - 6D + 9)y = e^{2x} + e^{3x} + x^2$ .

13. (a) State and prove first shifting theorem on Laplace transforms.

(b) Find  $L^{-1} \left[ \frac{1 - \cos t}{t} \right]$ .

14. (a) Using convolution theorem, find  $L^{-1} \left[ \frac{1}{(s^2 - 9)(s - 3)} \right]$ .

(b) Find  $L^{-1} \left[ \frac{s}{(s-1)(s-2)} \right]$ .

15. Obtain the Fourier series for the function  $f(x) = x^2$  for the interval  $(-\pi, \pi)$ .
16. Obtain the Fourier sine series for the function  $f(x) = e^x$  for the interval  $(0, 2\pi)$ .
17. (a) If 4 English, 5 drawing, 6 mathematics books are arranged in a shelf in one row, then find the probability that the books of same kind are side by side.
- (b) A speaks truth in 80% of cases and B in 60% cases. Find the percentage of the cases of which they likely to contradict each other in stating the same fact.
18. (a) Define (i) addition theorem, (ii) multiplication theorem and (iii) conditional probability on probability.
- (b) If  $P(A) = \frac{1}{2}$ ;  $P(B) = \frac{1}{3}$ ;  $P(A \cap B) = \frac{1}{4}$ , find (i)  $P(A/B)$ , (ii)  $P(B/A)$  and (iii)  $P(A \cup B)$ .

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