



C14-C/CM/IT-401

4424

**BOARD DIPLOMA EXAMINATION, (C-14)**

**OCT/NOV—2018**

**DCE—FOURTH SEMESTER EXAMINATION**

**ENGINEERING MATHEMATICS-III**

Time : 3 Hours]

[Total Marks : 80]

**PART—A**

$10 \times 3 = 30$

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

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

(2) Answers should be brief and straight to the point and shall not exceed **five** simple sentences.

1. Solve  $(D^2 + 3D + 2)y = 0$ , where  $D = \frac{d}{dx}$

2. Solve  $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - \frac{dy}{dx} + y = 0$

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

4. Find  $L\{\sin^2 t\}$

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

6. Find  $L^{-1}\left\{\frac{2s+1}{s^2-9}\right\}$

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

8. Find the value of  $a_0$  in the Fourier series of  $f(x) = e^{ax}$  in  $(0, 2\pi)$ .

9. Write the Fourier sine series of  $f(x)$  in  $(0, 2)$ .  
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10. Find the probability of getting a red ball when a ball is drawn from a bag containing 5 red, 2 black and 4 green balls.

## PART—B

$10 \times 5 = 50$

**Instruction :** (1) Answer any **five** questions.  
(2) Each question carries **ten** marks.  
(2) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Solve  $(D^2 + 2D - 8)y = e^{-3x} + e^{-4x}$

(b) Solve  $(D^2 - 4D - 5)y = \cos 2x$

12. (a) Solve  $(D^2 - 8D + 9)y = \sin 3x$

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

13. (a) Find  $L\left\{\int_0^\infty e^{-2t} \cdot t \cdot dt\right\}$

(b) Find  $L^{-1}\left\{\frac{2s+1}{(s^2+6s+5)}\right\}$

14. Solve  $y^{11} + y = 4e^t$  using Laplace transform method given that  $y(0) = 0$  and  $y^1(0) = 0$ .

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15. Expand the function  $f(x) = x^2$  as Fourier series in the interval  $(-\Pi, \Pi)$

16. Obtain Fourier half range consine series for  $f(x) = \pi - x$  in the interval  $0 \leq x \leq 2$ .

17. (a) A given problem is solved by 3 students independently with probabilities of  $2/5$ ,  $1/2$  and  $1/4$ . What is the probability that the problem is solved.  
(b) Find the probability of getting at least one tail if four coins are tossed once.

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- 18.** (a) For any 2 events A & B, if  $P(A) = 2/3$ ,  $P(B) = 3/4$  and  $P(A \cup B) = 5/6$ . Find  $P(A/B)$  and  $P(B/A)$ .
- (b) Two members A and B appear for a interview for the same post of two vacancies. The probability of A's selection is  $1/7$  and that of B's selection is  $1/5$ . What is the probability that only one of them is selected.

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