



C14-C-401/ C14-  
CM-401/ C14-IT-401

**4424**

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

**OCT / NOV-2017**

**DCE-FOURTH SEMESTER EXAMINATION**

**ENGINEERING MATHEMATICS-III**

Time : 3 Hours ]

[Total Marks : 80

**PART - A**

3 X 10 = 30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.

1. Solve  $(D^2 - 5D + 6) y = 0$
2. Solve  $(D^3 + 3D^2 + 3D + 1) y = 0$
3. Find the particular integral of  $(D^2 + 4) y = \text{Cos}2x$
4. Find the Laplace transformation of  $3e^{2t} + 5t^2 + 3 \text{Sin}4t + 5 \text{Cos} 2t$
5. Find L  $(t \text{Sin} 3t)$
6. Evaluate  $\int_0^{\infty} te^{-3t} dt$
7. Find  $L^{-1} \left\{ \frac{1}{s(s-2)} \right\}$
8. Find the Fourier Series expansion of  $f(x) = x$ , in  $(-\pi, \pi)$
9. Find the half range Sine series of  $f(x) = x + 1$  in  $(0, \pi)$
10. Out of 10 girls in a class 4 have blue eyes, if 2 of the girls are chosen then find the probability that both have blue eyes.

**PART - B**

10 X 5 = 50

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

11. Solve  $(D^2 + 2D + 1)y = \text{Cosh}x + \text{Sin}x + 4 + \text{Cos}2x$ .
12. Solve  $(D^2 + 8D + 16)y = e^{-4x} + 5 + x^2$ .
13. a. Find  $L\left\{\frac{1 + \text{Cos}2t}{t}\right\}$   
b. Find  $L\left\{\int_0^t e^{-t} \text{Cos}2tdt\right\}$
14. a. Find  $L^{-1}\left\{\frac{1}{(S+1)(S+2)}\right\}$  using convolution theorem.
15. Expand  $f(x) = x \text{Sin}x$  as Fourier series in  $0 < x < 2\pi$ .
16. Find the half-range Cosine series for the function  $f(x) = x^2$  in the interval  $(0, \pi)$   
and hence find  $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$
17. a. IF 4 English, 3 Drawing and 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. The probabilities of solving specific problem independently by A and B are  $\frac{1}{3}$  and  $\frac{1}{5}$  respectively. If both try to solve the problem independently find the probability that (i) problem is solved (ii) exactly one of them solve the problem.
18. a. Evaluate  $P(A \cup B)$  if  $2P(A) = P(B) = \frac{5}{13}$  and  $P(A/B) = \frac{2}{5}$   
b. If  $P(A) = \frac{3}{8}$ ,  $P(B) = \frac{1}{2}$  and  $P(A \cap B) = \frac{1}{4}$ , find  $P(A \cup B)$

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