



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

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BOARD DIPLOMA EXAMINATION, (C-14)

OCT / NOV-2017

DCE-FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS-III

Time : 3 Hours]

[Total Marks : 80

PART - A

$3 \times 10 = 30$

- 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 $(D^2 + 4) y = \cos 2x$
4. Find the Laplace transformation of $3e^{2t} + 5t^2 + 3 \sin 4t + 5 \cos 2t$
5. Find $L(t \sin 3t)$
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 $(D^2 + 2D + 1)y = \text{Cosh}x + \text{Sinx} + 4 + \text{Cos}2x$.

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 $L\left\{\int_0^t e^{-s} \text{Cos}2s dt\right\}$

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 $P(AAB) = \frac{1}{4}$, find $P(A \cup B)$

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