



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

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BOARD DIPLOMA EXAMINATION, (C-14)
JUNE—2019
DCE—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.

1. Solve $(D^2 - 5D + 6)y = 0$.

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

3. Find the particular integral of $(D^2 + 2D + 1)y = e^{3x}$.

4. Find $L\{t^2 + 2t + \cos 2t\}$.

5. Find $L\{e^{2t} \cdot \sinh 4t\}$.

6. Find $L^{-1}\left\{\frac{2s+3}{s^2+9}\right\}$.

7. Find $L^{-1}\left\{\frac{1}{(s+2)^2+16}\right\}$.

- * 8. Write the Euler's formulae for Fourier series of a function $f(x)$ in the interval $(-\pi, \pi)$.
9. Find the a_0 for $f(x) = e^x$ in $(0, 2\pi)$.
10. When four coins are tossed simultaneously, find the probability of getting two heads and two tails.

PART—B

10×5=50

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

11. (a) Solve $(D^2 - 3D + 2)y = 5e^{3x}$.

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

12. Solve $(D^2 + D - 2)y = 5 + \sin x + x$.

13. (a) Find $L\{e^{12t} \cdot \sin 5t \cdot \cos 7t\}$.

(b) Find $L\{t \cdot e^{-t} \cdot \sin 4t\}$.

14. (a) Find $L^{-1}\left\{\frac{s}{s^2 + 4s + 13}\right\}$.

(b) Find $L^{-1}\left\{\frac{1}{(s+1) \cdot (s+3)}\right\}$.

* 15. Expand the function $f(x) = x + x^2$ as a Fourier series in $(-\pi, \pi)$.

16. Obtain Fourier series for the function $f(x) = x^2$ in $(-l, l)$.

- * **17.** (a) If A and B are mutually independent events, such that

$$P(A) = \frac{4}{5} \text{ and } P(B) = \frac{3}{5} \text{ then find } P(A \cup B).$$

- (b) A fair die is rolled twice. What is the probability that an odd number will follow an even number?

- 18.** These are three boxes I, II and III. Box I contains 4 red, 5 blue and 6 white balls. Box II contains 3 red, 4 blue and 5 white balls. Box III contains 5 red, 10 blue and 5 white balls. One box is chosen and one ball is drawn from it. What is the probability that—

- (a) Red ball is drawn
(b) Blue ball is drawn
(c) White ball is drawn
