



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

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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

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