



C14-A-401/C14-AA-401/C14-AEI-401/
C14-CH-401/C14-CHST-401/C14-MET-401/
C14-MNG-401/C14-TT-401/C14-BM-**401**

4401

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2017

FOURTH SEMESTER (COMMON) 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 $(D^2 - 4D - 7)y = 0$.

2. Solve $(D^3 - D^2 - D - 1)y = 0$.

3. Find the particular integral of $(D^2 - 16)y = 8 \cos 4x$.

4. Evaluate $L\{(t^2 - 1)^2\}$.

5. Evaluate $\int_0^t e^{-t} \sin 2t \, dt$ by using Laplace transform technique.

6. Evaluate :

$$L^{-1} \frac{1}{(s-2)^2 - 16}$$

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7. Find :

$$L^{-1} \frac{1}{s(s^2 - 1)}$$

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

9. Find the value of b_n in $f(x) = x$ in $(,)$ in Fourier series expansion.

10. A card is drawn at random from a well-shuffled pack of 52 cards. What is the probability that the card is a king?

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

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

11. (a) Solve $(D^2 - 2D - 1)y = e^x - 1$.

(b) Solve $(D^2 - D - 2)y = x$.

12. Solve $(D^2 - 4D - 3)y = \sin 3x \cos 2x$.

13. Find the Laplace transform of (a) $e^{2t}(2 \cos 3t - 3 \sin 3t)$ and (b) $t^2 \sin 3t$.

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14. (a) Find :

$$L^{-1} \frac{1}{(s - 1)(s - 2)}$$

(b) Solve $y'' - y = 0$, if $y(0) = 1$, $y'(0) = 2$ by using Laplace transform method.

- * **15.** (a) Obtain the Fourier series for $f(x) = x^2$ in the interval $[-\pi, \pi]$.
 (b) Find the half-range sine series for the function $f(x) = e^x$ in the interval $(0, \pi)$.

- 16.** Find the Fourier series expansion for $f(x)$ if

$$f(x) = \begin{cases} x, & \text{if } -\pi < x < 0 \\ x, & \text{if } 0 < x < \pi \end{cases}$$

and hence deduce that

$$\frac{1}{1^2} - \frac{1}{3^2} + \frac{1}{5^2} - \dots = \frac{2}{8}$$

- 17.** (a) Two dice are tossed once. Find the probability of getting 'an even number on the first die or a total of 8'.
 (b) The probability that A can solve the problem is $\frac{4}{5}$, B can solve it is $\frac{2}{3}$ and C can solve it is $\frac{3}{7}$. If all of them try independently, then find the probability that the problem will be solved.
- 18.** (a) An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both drawn balls are black?
 (b) Bag I contains 3 red and 4 black balls while another bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from bag II.
