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C14-EE-401/C14-CHPP-401/

C14-PET-401

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**BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2018
DEEE—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.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Solve $(D^2 - 6D + 4)y = 0$.

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

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

4. Find $L(\sin^2 2t)$.

5. Find $L(t^3 e^{-5t})$.

6. Evaluate $\int_0^{\infty} e^{-4t} \cos 3t dt$

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

8. Find the Fourier coefficient b_n for the function $f(x) = x$ in the interval $(0, \pi)$.

9. Write the Fourier series for the function $f(x)$ defined in the interval $(c, c + 2\pi)$.

10. A bag contains 5 black, 7 red and 4 white balls. A ball is drawn at random. Find the probability that the ball drawn is white.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. (a) Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^{3x} \sinh 2x$

(b) Solve $(D^3 + 4D)y = \cos 2x$

12. (a) Solve $(D^2 - 4D + 3)y = x^2$

(b) Find the particular integral of $(D^2 + D - 2)y = x + \sin x$

13. (a) Find $L\left(\frac{1 - \cos t}{t}\right)$.

(b) Find $\left(\int_0^{\infty} te^{-t} \sin t dt\right)$

14. Using Laplace transform method, solve

$Y''' + 2Y'' - Y' - 2Y = 0$ given $Y(0) = Y'(0) = 0$ and $Y'''(0) = 6$.

15. Obtain the Fourier series of $f(x) = e^{ax}$ in the interval

$-\pi < x < \pi$.

16. Find the Fourier series of the function $f(x)$ given by $f(x) = x - 2$ in the interval 0 to 2π .

17. (a) The probability for a contractor to get a road contract is $\frac{2}{3}$ and to get a building contract is $\frac{5}{9}$. The probability to get at least one contract is $\frac{4}{5}$. Find the probability that he gets the both the contracts.

(b) A card is selected at a random from a pack of cards. Let 'A' be the event that card is below 5 and 'B' be the event that the card is heart. Show that A and B are independent events.

18. There are two identical boxes containing respectively 3 blue, 2 red marbles; and 2 blue, 5 red marbles. A marble is drawn at random from one of the boxes turns out to be blue. What is the probability that it came from the first box?

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