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

4461

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2018

DEEE—FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS-III

Time : 3 Hours] [*Total Marks* : 80

PART—A 3×10=30

Instruction : (1) Answer **all** questions. Each question carries **three** marks.

(2) Answers should be brief and straight to the point and shall not exceed **five** simple sentences.

1. Solve $(D^2 + 5D - 6)y = 0$, where $D = \frac{d}{dx}$.

2. Solve $(D^3 - 2D^2 - D + 2)y = 0$, where $D = \frac{d}{dx}$.

3. Find the particular integral of $(D^2 + 9)y = \cos 3x$.

4. Find

$L\{e^{2t} + 4t^3 + \cos 3t\}$

5. Find

$L\{t^3.e^{-3t}\}$

6. Find

$L^{-1}\left\{\frac{s^2 - 3s + 4}{s^3}\right\}$

7. Find

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

8. Find the value of a_0 in $f(x) = x \cos x$ in the interval $[0, 2\pi]$.

9. Write down the formulae for Fourier coefficients and Fourier series expansion of a function $f(x)$ in the interval $(C, C + 2l)$

10. Find the probability of getting all heads when three coins are tossed once.

PART—B 10×5=50

Instruction : (1) Answer any **five** questions and each question carries **ten** marks.

(2) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answers.

11. (*a*) Solve

$$(D^2 + D - 6)y = e^{3x} + e^{-3x}$$

(b) Solve

$$(D^2 + D - 2)y = \sin x$$

12. Solve

$$(D^2 + 5D + 4)y = (x^2 + 7x + 9) + \cos 2x$$

13. (a) Find

$$L\left\{\frac{\sin 4t}{t}\right\}$$

(b) Find

$$\left\{\frac{2s}{(s-1)(s+2)}\right\}$$

14. Solve $y^{11} + y = t$ using Laplace transform method given that

$y(0) = 1$ and $y^{1}(0) = -2$

15. Obtain the Fourier series of $f(x) = x^2$ in the interval $[0, 2\pi]$.

16. Expand $f(x) = x$ in $0 < x < 2$ by Fourier half range cosine series.

17. (*a*) If 4 English, 5 Drawing and 6 Mathematics books are arranged in a shelf at random in a row, then find the probability that the books of each kind come tog.

(*b*) *A*, *B* , *C* are three newspapers published from a city, 20% of people read *A*. 16% read *B*, 14% read *C*, 8% read both *A* and *B*, 5% read both *B* and *C*, 4% read both A and C and 2% read all three newspapers. Find the percentage of population who read at least 1 newspaper.

18. (*a*) A bag contains 6 red, 7 black and 8 blue balls. If two balls are drawn simultaneously what is the probability that one is read and the other is black.

(*b*) If *A* and *B* are any 2 events with $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{7}{12}$. Find $P\left(\frac{A}{B}\right)$ and $P\left(\frac{B}{A}\right)$.

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