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C14–EE–401/C14–CHPP–401/C14–PET–401

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

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 $(D^2 \quad 2D \quad 5)y \quad 0$.

2. Solve $(D^2 \quad 10D \quad 25)\,y \quad 0$.

3. Find the particular integral of $(D^2 \quad 9)\,y \quad \sin 3x$.

4. Find the Laplace transform of the function $t^2 \quad \sinh 2t \quad \sin 2t$.

5. Find $L((t \quad 1)^2)$.

6. Find $L(e^{2t} \cos 3t)$.

7. Find the inverse Laplace transform of $\frac{s \quad 1}{s^2 \quad 4}$.

8. Write down the Fourier's series expansion of a function $f(x)$ in the interval $(-1, 1)$. Give the corresponding formulae for finding the Fourier's coefficients.

9. Calculate the Fourier's coefficient a_n for Fourier's series expansion of the function $f(x) = x$ in the interval $(0, 2\pi)$.

10. If a coin is tossed twice, what is the probability of getting head at least once?

PART—B $10 \times 5 = 50$

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

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

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. *(a)* Solve the differential equation $(D^2 - 7D - 10)y = 3e^{5x}$.

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

12. *(a)* Solve $(D^2 - 16)y = \cosh 4x$.

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

13. *(a)* Find $L(te^{-2t} \sin 3t)$.

(b) Using convolution theorem, find $L^{-1}\left\{\frac{1}{(s-a)(s-b)}\right\}$.

14. *(a)* Find the Laplace transform of $\frac{e^t - \cos t}{t}$.

(b) Find $L^{-1}\left\{\frac{s-2}{s^2 - 4s - 8}\right\}$.

15. Obtain the Fourier's series expansion of the function $f(x)$ $x(1 \quad x)$ in the interval $(-1, 1)$.

16. Find the Fourier's series expansion for $f(x)$ $\begin{matrix} k \text{ for } & x & 0 \\ x \text{ for } 0 & & x \end{matrix}$ for any constant k.

17. *(a)* State the addition theorem on probability. A card is drawn from a pack of 52 cards.Find the probability that the drawn card is a spade or a king, using addition theorem on probability.

(b) A committee of five members is to be formed from six men and five women. Find the probability that the committee has at least two women members.

18. *(a)* It is noticed that a person *A* speaks truth in 60% of cases while *B* speaks truth in 80% of cases. If they are narrating same incident, what is the probability they are likely to contradict each other?

(b) A coin is tossed three times. What is the probability that—

(i) head appears at least twice;

(ii) tail appears twice in a row?

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