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C14–EC–401/C14–CHPC–401/C14–PCT–401

4455

BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

DECE—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 the equation $\frac{d^2x}{dt^2}$ 6$\frac{dx}{dt}$ 9x 0.

2. Solve $(D^4$ 16$)y$ 0.

3. Find the particular integral for $(2D^2$ D 6$)y$ e^{2x}.

4. Find the Laplace transform of $\sin 8t.\cos 4t$.

5. Define convolution of two functions and state the convolution theorem.

6. Find the inverse Laplace transform of $\frac{6}{(s^2 \quad 4)}$ $\frac{1}{s \quad 6}$ $\frac{1}{s^2}$.

7. Find inverse Laplace transform of $\frac{s}{(s \quad 2)^3}$.

8. Write the formulae for Fourier series of a function $f(x)$ in the interval $[C, C \quad 2l]$.

9. Find the Fourier coefficient a_0 for $f(x) \quad (l \quad x)^2$ in $(\ l, l)$.

10. An integer is picked from 1 to 20 numbers, both inclusive. Find the probability that it is a prime.

PART—B 10×5=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 $(D^2 \quad 2D \quad 8)y \quad e^{3x} \quad e^{4x}$.

(b) Solve $(D^2 \quad 8D \quad 9)y \quad \sin 3x$.

12. *(a)* Solve $(D^2 \quad 4D \quad 4)y \quad x^3$.

(b) Solve $(D^3 \quad 4D)y \quad \cos 2x \quad x$.

13. *(a)* Find Laplace transform of $\frac{1 \quad \cos t}{t}$.

(b) Evaluate $_0 te^{2t} \sin 3t\, dt$, using Laplace transform.

14. *(a)* Find $L^{1} \frac{s \quad 2}{s^2 \quad 4s \quad 13}$.

(b) Find $L^{1} \frac{1}{s^2 (s^2 \quad a^2)}$ using convolution theorem.

15. Find Fourier series for the function $f(x)$ x x^2 in (2, 2).

16. *(a)* Expand $f(x)$ x^3 as Fourier series in x .

(b) Find the half range sine series for

$$f(x) \quad \begin{array}{l} x \quad \text{for } 0 \quad x \quad \frac{}{2} \\ x \text{ for } \frac{}{2} \quad x \end{array}$$

17. *(a)* When two dice are thrown simultaneously, find the probability of getting a sum an even number.

(b) Find the probability of drawing an ace or a spade or both of them from a deck of cards.

18. *(a)* Let A and B are independent events with $P(A)$ $\frac{3}{5}$ and $P(B)$ $\frac{2}{5}$ and $P(A \quad B)$ $\frac{1}{4}$. Find *(i)* $P(A \quad B)$, *(ii)* $P(A^c)$ and $P(B^c)$, *(iii)* $P(A^c \quad B^c)$ and *(iv)* $P(B / A)$.

(b) State the addition and multiplication theorems of probability and explain conditional probability of two events.

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