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C14–IT–401/ C14–C–401/C14–CM–401

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016 DCE—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 $\frac{d^2y}{dx^2} \quad 6\frac{dy}{dx} \quad 8y \quad 0$.

2. Solve $(D^4 \quad 18D^2 \quad 81)y \quad 0$.

3. Find the particular integral for $(D^2 \quad 9)y \quad \cos 3x \quad e^{\ 3x}$.

4. State the first shifting and second shifting theorems of Laplace transforms.

5. Find the Laplace transform of $4e^{2t} \quad 6t^3 \quad 2\cos 5t$.

6. Find the inverse Laplace transform of $\frac{4s \quad 5}{(s \quad 1)^4}$.

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

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

9. Find the half range Fourier sine series of $f(x) \quad K$ in $(0, \quad)$ for any constant K.

10. State addition and multiplication theorems of probability for two events.

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 $(D^2 \quad D \quad 6)y \quad e^{\ 2x}$.

(b) Solve $(D^3 \quad 4D)y \quad 5 \quad \sin 2x$.

12. *(a)* Solve $(D^2 \quad 2D \quad 1)y \quad x^3$.

(b) Solve $(D^4 \quad 81)y \quad \cos 3x \quad \sinh 3x$.

13. *(a)* Find the Laplace transform of $t.\sin 2t.\cos t$.

(b) Find the Laplace transform of $\int_0^t \frac{e^t \sin t}{t} dt$.

14. *(a)* Find $L^{\ 1}\left\{\frac{20 \quad 4s}{s^2 \quad 4s \quad 20}\right\}$.

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

15. Find Fourier series for the function in (,), where $f(x)$ for x 0 x for 0 x .

16. *(a)* Expand $f(x)$ $|x|$ as Fourier series in (–2, 2).

(b) Find the half range cosine series for $f(x)$ x in (0, 2).

17. *(a)* When two dice are thrown simultaneously, find the probability of getting a sum of 8.

(b) In a hostel 60% students read Telugu newspaper, 40% students read English newspaper and 20% read both the papers. A student is selected at random, find the probability that the student reads neither Telugu for English newspaper.

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

(b) Box–I contains 8 white and 2 black balls, Box–II contains 5 white, 5 black balls and Box–III contains 4 white and 6 black balls. A box is selected at random and a ball is drawn from it, what is the probability that the ball is white?

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