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C14–EC–401/C14–CHPC–401/C14–PCT–401

4455

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2017

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 $\frac{d^2y}{dx^2} \quad 3\frac{dy}{dx} \quad 4y \quad 0.$

2. Solve $\frac{d^3y}{dx^3} \quad 6\frac{d^2y}{dx^2} \quad 11\frac{dy}{dx} \quad 6y \quad 0.$

3. Find the particular integral of $\frac{d^2y}{dx^2} \quad \frac{dy}{dx} \quad 3y \quad e^{2x}.$

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

5. Find $L[\sin^2 t]$.

6. Find $L^{\ 1}\ \frac{2s \quad 3}{s^2 \quad 4}$.

7. Find the inverse Laplace transform of $\frac{s^2 \quad 4s \quad 20}{s^3}$.

8. Write down the formulae for finding Fourier constants for $f(x)$ in (,).

9. Find the constant term in the Fourier series corresponding to $f(x) \quad x \quad x^3$ in (,).

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

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 $(D^2 \quad D \quad 2)y \quad \sin 2x$.

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

(b) Find the particular integral of $(D \quad 1)^2 y \quad x$.

13. *(a)* Find the Laplace transform of $e^{\ t} \cos 2t$.

(b) If $L\{f(t)\} \quad \frac{20 \quad 4s}{s^2 \quad 4s \quad 20}$, find $L\{e^{\ t} f(2t)\}$.

14. *(a)* Find $L^{\ 1} \frac{1}{s^2 \quad 5s \quad 6}$.

(b) Using convolution theorem, find $L^{\ 1} \frac{1}{(s \quad 1)(s \quad 2)}$.

15. Expand the function $f(x)$ x^2 as a Fourier series in , , hence deduce that $\frac{1}{1^2}$ $\frac{1}{2^2}$ $\frac{1}{3^2}$ $\frac{1}{4^2}$ $\cdots$ $\frac{2}{12}$.

16. Find the Fourier series expansion of

$f(x)$ 2, 2 x 0

x, 0 x 2

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

(i) 8 or 9

(ii) more than 10

(b) State addition theorem on probability. If $P(A)$ 0 2, $P(B)$ 0 6 and $P(A \quad B)$ 0 3, find $P(A \quad B)$ for any events A, B.

18. *(a)* The letters of the word EQUATION are arranged in a row at random. Find the probability that the consonents may be in the even places.

(b) Two cards are drawn from a well-shuffled pack. Find the probability that *(i)* both cards are kings and *(ii)* one is king and the other is ace.

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