4461

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2017

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.

1. Solve $\dfrac{d^2y}{dx^2} \; 5\dfrac{dy}{dx} \; 4y \; 0.$

2. Solve $\dfrac{d^2y}{dx^2} \; y \; 0.$

3. Find the particular integral of $(D^2 \; 7D \; 6)y \; e^{2x}.$

4. Find the Laplace transform of $(t^2 \; 1)^2.$

5. Find $L\,(e^{2t} \; 4t^3 \; 2\sin 3t).$

6. Find the inverse Laplace transform of $\dfrac{s^2 \; 4s \; 5}{s^3}.$

7. Find $L^{-1}\left[\dfrac{3}{(s-1)^4}\right]$.

8. Write down the formulae for finding Euler's constants of a Fourier series in $(0, 2\pi)$.

9. In the Fourier series expansion of $f(x) = |\sin x|$ in $(-\pi, \pi)$, what is the value of a_o?

10. A coin is tossed twice. Find the probability of not getting a tail in each toss.

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PART—B

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10×5=50

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

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

11. *(a)* Solve $(D^2 - D - 6)y = e^{3x} + e^{-3x}$.

(b) Solve $(D^2 - D - 1)y = 2\sin 3x$.

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

(b) Solve $(D^2 - 31)y = x$.

13. *(a)* Find $L\left[e^t(t^2 - 6t + 7)\right]$.

(b) If $L\{f(t)\} = \dfrac{s^2 + s + 1}{(2s+1)^2(s-1)}$, find $L\{f(2t)\}$.

14. *(a)* Find $L^{-1}\left[\dfrac{5s+1}{(s-2)(s-1)}\right]$.

(b) Solve the differential equation $\dfrac{d^2y}{dt^2} + 4\dfrac{dy}{dt} + 3y = 0$

with initial conditions $y = 3$ and $\dfrac{dy}{dt} = 1$ at $t = 0$.

15. Express $f(x) = x$ as a Fourier series in $(-\pi, \pi)$.

16. Obtain the Fourier series to represent $f(x) = \dfrac{1}{4}(\pi - x)^2, 0 \le x \le 2\pi$.

17. Find $P(A \cup B)$ if—

(a) $P(A) = \dfrac{1}{2}$, $P(B) = \dfrac{1}{4}$, $P(A \cap B) = \dfrac{1}{8}$;

(b) $P(A) = 0 \cdot 25$, $P(B) = 0 \cdot 5$, $P(A \cap B) = 0 \cdot 16$;

(c) $P(A) = \dfrac{2}{7}$, $P(B) = \dfrac{3}{5}$;

A and B are disjoint.

18. *(a)* A book containing 100 pages is opened at random. Find the probability that on the page a doublet is found.

(b) If a page is randomly selected from a book of 100 pages, then find the probability that the sum of the digits of the pages is 10.

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