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C14-EE-401/C14-CHPP-401/C14-PET-401

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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 $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 4y = 0$.

2. Solve $\frac{d^2y}{dx^2} - y = 0$.

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 $\frac{s^2 - 4s + 5}{s^3}$.

7. Find $L^{-1} \frac{3}{(s-1)^4}$.

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_0 ?

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

PART—B

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 $L^{-1} e^t(t^2 - 6t - 7)$.

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

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

(b) Solve the differential equation $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 3y = 0$
with initial conditions $y = 3$ and $\frac{dy}{dt} = 1$ at $t = 0$.

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

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

17. Find $P(A \cap B)$ if—

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

(b) $P(A) = 0.25, P(B) = 0.5, P(A \cup B) = 0.16$;

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

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.
