



BOARD DIPLOMA EXAMINATION, (C-14)
OCT / NOV-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.
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Solve $(D^2 - 2D + 5)y = 0$, where $D = \frac{d}{dx}$
2. Solve $y^{11} - 18y^1 + 77y = 0$
3. Find the particular integral of $(D^2 - 4D + 3)y = e^{2x}$
4. Find $L \{(t + 2)e^t\}$
5. Evaluate $\int_0^{\infty} e^{-2t} \cos 3t dt$ using Laplace transform.
6. Find $L^{-1} \left(\frac{3}{s^2 + 4} + \frac{2}{s^2 - 9} \right)$
7. Find $L^{-1} \left(\frac{1}{(s - 3)^5} \right)$
8. Find the value of b_n , if $f(x) = \cos x$ in the Fourier series expansion of $f(x)$ in $(-\pi, \pi)$.
9. Write the Fourier constants in the Fourier series of $f(x)$ in $(-\pi, \pi)$ where $f(x)$ is an odd function.
10. If a coin is tossed twice, what is the probability of getting both heads.

PART - B

10 × 5 = 50

- Instructions :** (1) Answer any **five** questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. a) Solve $(D^2 + D) y = \cos x$
b) Solve $(D^2 + 2D + 1) y = x^2 + 2x$
12. a) Solve $(D^2 + 4) y = \sin^2 x$
b) Solve $(D + 1)^2 y = e^{-x} + x$
13. a) Find $L(te^{2t}\sin 3t)$
b) Find $L^{-1}\left(\frac{s + 2}{s^2 - 2s - 8}\right)$
14. Use Laplace transform method to solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = e^{-t} \sin t$ given that $y(0) = 0, y'(0) = 1$.
15. Expand the function $f(x) = |x|$ as a Fourier series in the interval $(-\pi, \pi)$.
16. Find the half range cosine series for the function $f(x) = x - x^2$ in $0 < x < 1$.
17. a) Let A, B be two events with $P(A) = 1/5, P(B) = 2/3, P(A \cup B) = 4/5$, then find $P(A \cap B)$.
b) A die is thrown twice. What is the probability of getting an even number on the first throw and an odd number on the second throw.
18. a) Define the following on probability.
i) Addition theorem
ii) Multiplication theorem
iii) Conditional Probability
b) Two persons A and B appear in an interview for two vacancies in the same post. The probability of A's selection is $1/3$ and that of B's selection is $1/4$. What is the probability that
i) both of them will be selected?
ii) only one of them will be selected?

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