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BOARD DIPLOMA EXAMINATION, (C-14)

OCT / NOV-2017

DME-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 $(D^2 + 4D + 4)y = 0$ where $D = \frac{d}{dx}$
2. Solve $2y'' - 5y' + 4y = 0$
3. Find the particular integral of $(D^2 + 1)y = -3\sin 2x$
4. Find $L[\cos^2 t]$
5. Find $L(t^2 e^{-3t})$
6. Find $L^{-1}\left(\frac{1}{(s^2 + 1)} + \frac{2s}{s^2 + 16}\right)$
7. Find $L^{-1}\left(\frac{1}{s(s+2)}\right)$
8. Find the Fourier constant a_0 , for $f(x) = x + x^2$ from $x = -\pi$ to $x = \pi$
9. If $f(x)$ is even function in $(-1, 1)$ then write the Fourier constants in the Fourier series of $f(x)$ in $(-1, 1)$
10. What is the probability of obtaining a total of 8 or 9 in a single throw of two dice.

PART - B

10 x 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 $(D^2 + 5D + 4) y = x^2 + 9$
12. a) Solve $(D^2 - 2D + 1) y = x^4 + \cos x$
b) Solve $(D^2 + 4) y = e^x + \sin^2 x$
13. a) Find $L\left(\frac{\sin 2t}{t}\right)$
b) Find $L^{-1}\left(\frac{1}{(s^2 + 2)(s + 3)}\right)$
14. Use Laplace transform method to solve $y'' + 4y' + 3y = e^{-t}$ when $y(0) = 1, y'(0) = 1$
15. Find the half range sine series for $f(x) = x(\pi - x)$ in $0 < x < \pi$.
16. Find the Fourier series of the function $f(x)$ given by
 $f(x) = 0$ if $-\pi < x < 0$
 $= x^2$ if $0 < x < \pi$
17. a) If A, B are two events and $P(A) = 3/8, P(B) = 5/8, P(A \cup B) = 3/4$, then find $P(A/B)$ and $P(B/A)$.
b) A Problem in Mathematics is given to three students X, Y, Z whose chances of solving it are $1/3, 1/4$ and $1/5$ respectively. If they try it independently, what is the probability that the problem will be solved.
18. a) A die is tossed twice. Find the probability of obtaining a getting number greater than 3 on each toss.
b) A bag contains 5 red and 4 blue balls. If two balls are drawn successively without replacement, what is the probability that both are red.

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