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C14-M/CHOT/RAC-**401**

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BOARD DIPLOMA EXAMINATION, (C-14)

JUNE—2019

DME—FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS - III

Time : 3 Hours] [*Total Marks* : 80

PART—A 3×10=30

Instruction : (1) Answer **all** questions.

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

1. Solve

$(D^2 + 4D + 4)\, y = 0$

2. Solve

$(D^3 - 7D - 6)\, y = 0$

3. Find the particular integral of $(4D^2 + 4D - 3)\, y = e^{3x}$.

4. Find the Laplace transform of $e^{4t} - 3t^2 + 2\cos t$.

5. Find the Laplace transform of $\sin^2 t$.

6. Find the Laplace transform of te^{4t}.

7. Find the inverse Laplace transform of $\frac{2s+1}{s^2-9}$.

8. Write down the formulae for finding Euler's constants for $f(x)$ in $(0, 2\pi)$.

9. What is the value of b_n in the Fourier series expansion of

$f(x) = x \sin x$ in $(-\pi, \pi)$

10. When two dice are thrown, find the probability of obtaining total scores 7.

PART—B 10×5=50

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

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

11. *(a)* Solve

$$(D^2 + 5D + 6)\, y = e^{-2x}$$

(b) Solve

$$(D^2 + 25)\, y = \cos 5x$$

12. *(a)* Solve

$$(D^2 - 4D + 3)\, y = e^{2x} - \sin 3x$$

(b) Solve

$$(D^2 + 3D + 2)\, y = x^2$$

13. *(a)* Find the Laplace transform of $e^{-3t}(\cos 5t - \sin 3t)$.

(b) Find the Laplace transform of $t^2 \cos t$.

14. *(a)* Evaluate $\int_0^\infty e^{-4t} \sin 3t$

(b) Find $L^{-1}\left\{\frac{2s+1}{s^2+9}\right\}$

15. Write down the Fourier series for $f(x) = |x|$ in the interval $-\pi < x < \pi$.

16. Find the cosine and sine series for $f(x) = \pi - x$ in $(0, \pi)$.

17. *(a)* A card is drawn from a packet of hundred cards numbered 1 to 100. Find the probability of drawing a number which is divisible by 13.

(b) Find the probability of getting at least 2 heads when tossing 6 coins.

18. *(a)* 5 boys and 3 girls sit in a row at random. Find the probability that no two girls sit together.

(b) If $P(A) = 0.4$, $P(B) = 0.7$ and $P(A \cap B) = 0.3$, find $P(\overline{A} \cap \overline{B})$ and $P(\overline{A} \cup \overline{B})$.

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