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

4477

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2018

DME—FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS - III

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

PART—A 3×10=30

Instruction : (1) Answer **all** questions. Each question carries **three** marks.

(2) Answers should be brief and straight to the point and shall not exceed **five** simple sentences.

1. Solve $(D^2 + 3D + 2)y = 0$

2. Solve $(D^3 - 2D^2 - D + 2)y = 0$

3. Find the particular integral of $(D^2 - 5D + 6)y = e^{-2x}$

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

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

6. Find the Laplace transform of $t \sin 2t$

7. Find the inverse Laplace transform of $\frac{s}{(s+2)^2}$

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 $f(x) = |x|$ in $(-\pi, \pi)$.

10. In an experiment of tossing 4 coins simultaneously, write the probability of successes for getting 2 heads.

PART—B 10×5=50

Instruction **:** (1) Answer any **five** questions. Each question carries **ten** marks.

(2) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. *(a)* Solve $(D^2 - 5D + 6)y = 3e^{5x}$

(b) Solve $(D^2 + 16)y = \cos 4x$

12. *(a)* Solve $(D^2 - 2D + 2)y = e^{3x} + \sin 2x$

(b) Solve $(D^2 - 4D + 4)y = 2x^3 - 1$

13. *(a)* Find the Laplace transform of $\sin 2t \cos t$

(b) Find the Laplace transform of $t^2 \sin 3t$

14. *(a)* Evaluate $L\left\{\int_0^t e^{-4t} \sin 3t \, dt\right\}$

(b) $L^{-1}\left\{\dfrac{2s-5}{s^2-4}\right\}$

15. Write down the Fourier series for $f(x) = x - x^2$ in the interval $-\pi < x < \pi$.

16. Find the Fourier series of the function $f(x) = x$ in $-2 < x < 2$.

17. *(a)* A book contains 85 pages. A page is chosen at random. What is the probability that the sum of the digits on the page is 8 .

(b) What is the chance that a leap year selected at random will contain 53 Sundays.

18. *(a)* When two dices are thrown, find the probability of getting the sum 6 or 7.

(b) A card is drawn at random from a normal pack of cards. What is the probability that it is either a spade or a queen.

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