



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)  $L^{-1} \left\{ \frac{2s - 5}{s^2 - 4} \right\}$
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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