C14–M–401/C14–CHOT–401/C14–RAC–**401**

4477

BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

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.

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

1. Solve $(D^2 \; 4D \; 4)y \; 0$.

2. Solve $y \; 2y \; 3y \; 0$.

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

4. Find $L\{e^{2t} \; 4t^3 \; 2\sin 3t \; 3\cos 3t\}$.

5. Find $L\left\{ \dfrac{\sin t}{t} \right\}$.

6. Evaluate $\int_0 te^{3t}\,dt$ by using Laplace transform method.

7. Find the inverse Laplace transform of $\dfrac{5s \; 10}{9s^2 \; 16}$.

8. Find the value of a_0 in $f(x) = x$ in the interval $(0, 2\pi)$ by Fourier's series.

9. Find the value of b_n in $f(x) = \cos x$ in $(-\pi, \pi)$ in Fourier's series expansion.

10. Write down the mathematical definition of probability.

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PART—B 10×5=50

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

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

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

11. Solve $(D^2 - 5D + 6)y = \sin x + e^{2x}$.

12. *(a)* Solve $(D^2 + 9)y = \cos^2 x$.

(b) Solve $(D^2 - D - 2)y = x$.

13. Find *(a)* $L\{e^{-t}t\sin 2t\}$, and *(b)* $L^{-1}\dfrac{s}{(s-2)^2+4}$.

14. *(a)* Find $L^{-1}\dfrac{1}{(s-1)(s-2)}$.

(b) Solve $y'' + y = \sin 3t$ with $y(0) = y'(0) = 0$, by using Laplace transform method.

15. Find the Fourier's series for $f(x) = x + x^2$ in the interval $(-\pi, \pi)$.

16. Find the half-range Cosine series for the function $f(x) = x\sin x$ in the interval $(0, \pi)$.

17. *(a)* A committee of two persons is selected from two men and two women. Find the chance that the committee will have *(i)* no man, *(ii)* one man, and *(iii)* two men.

(b) What is the probability that a leap year, selected at random, will have 53 Sundays?

18. *(a)* Two dice are tossed once. Find the probability of getting 'an even number on the first die or a total of 8'.

(b) A problem in statistics is given to three students *A, B, C* whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ respectively. If they try it independently, what is the probability, that the problem will be solved?

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