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BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL–2018
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 questions carries **three** marks.
                  (3) Answers should be brief and straight to the point
                      and shall not exceed *five* simple sentences.

1. Solve $(D^2-2D+5)y = 0$

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

3. Find the particular integral of $(D^2-1)y = 1+ \cos 3x$

4. Find $L(\sin 3t. \sin 4t)$

5. Find $L(e^{-1} \cos 2t)$

6. Evaluate $\int_0^\infty e^{-3t} \sin 4t \, dt$

7. Find $L^{-1}\left(\dfrac{s}{(x+3)^2}\right)$

8. Find the value of b in $f(x) = \cos x$ in $(-\pi, \pi)$ by Fourier series.

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9. Write the Dirichlet conditions for the existence of Fourier series for a function in given interval.

10. A committee of two persons is selected from two men.

PART–B   5×10=50

Instructions: (1) Answer any *five* questions.
  (2) Each question carries **ten** marks.
  (3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. *(a)* Solve $(D^2-D-12)y = e^{4x}$

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

12. *(a)* Solve $(D^2+4)y = x^4$

  (b) Solve $(D^2-D^2-6D)y = x+\sin x$

13. Using Laplace transform method, solve $\dfrac{d^2 y}{dt^2}+y=t$ with conditions $y(0)=1$, $y(0)=-2$

14. Using convolution theorem, find $L\dfrac{1}{s(s-1)(s+2)}$

15. For A function $f(x)$ defined by $f(x)=|\sin x|$, obtain Fourier series in $(-\pi, \pi)$.

16. Find the Fourier series to represent $f(x)=2x-x^2$ in the interval $(0,2)$.

17. *(a)* If one ticket is randomly selected from tickets numbered 1 to 30, then find the probability that the number on the ticket is a multiple of 5 or 7.

  (b) The probability of a problem being solved by three students are, $\dfrac{1}{3}.\dfrac{1}{4},\dfrac{1}{5}$ find probability that the problem being solved.

18. Three boxes numbered I, II, III contain 1 white, 2 black and 3 red balls; 2 white, 1 black and 1 red ball; 4 white, 5 black and 3 red balls respectively. One box is randomly selected and a ball is drawn from it. If the ball is red, then find the probability that is from box II.