4461

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH /APRIL-2019
DEEE - FOURTH SEMESTER EXAMINATION
ENGINEERING MATHEMATICS-III

Time: 3 Hours   Max.Marks: 80

PART-A

10x3=30M

Instruction : 1) Answer **all** questions. Each question carries **three** marks.
2) Answers should be brief and stright to the point and shall not exceed five simple sentences.

1)   Solve $\dfrac{d^2 y}{dx^2} + 16y = 0$

2)   Solve $(D^3 - 2D^2 - 4D + 8)y = 0,$ where $D = \dfrac{d}{dx}$

3)   Find the particular integral of $(D^2 + 1)Y = \sin x$, where $D = \dfrac{d}{dx}$

4)   Find the Laplace transfor of $\cos^2 2t$.

5)   Find the Laplace tranform of $\dfrac{\sin t}{t}$

6)   Find the inverse laplace transform of $\dfrac{2s - 5}{s^2 - 4}.$

*   7)   Find the inverse laplace transform of $\dfrac{s}{(s+2)^2}$

8)   Find the value of a_0 in the fouries series expansion of F(x) =x cos x in the interval $(-\pi, \pi)$

9)   Write the formula for half-range fourier sine series of f(x) in the interval $(0, l)$

10) If a die is thrown once, find the probability of getting a prime number on the top of the die.

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PART-B

Instructions: 1) Answer any **Five** questions. Each question carries **Ten** marks.

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

11) (a) Solve $(D^2 - D - 6)y = e^{-2x}$, where $D = \dfrac{d}{dx}$

    (b) Solve $(D^2 + 2D + 1)y = 2x^2$, where $D = \dfrac{d}{dx}$

12) (a) solve $(D^2 - 4D + 3)Y = \sin 3x \cos 2x$, where $D = \dfrac{d}{dx}$

13) (a) Evaluate $\displaystyle\int_0^\infty te^{-2t} \sin t\, dt$ using laplace transforms.

    b) Using convolution theorem, evaluate $L^{-1} \left\{ \dfrac{1}{(s^2+1)(s^2+9)} \right\}$

14) Using laplace transform method, solve $\dfrac{d^2 y}{dt^2} - 3\dfrac{dy}{dt} + 2y = 2e^{3t}$ if $y(0) = 2 \,\& \, y'(0) = 3$

15) Explain $f(x) = \begin{cases} 1, 0 < x < \pi \\ 0, \pi < x < 2\pi \end{cases}$ as a fourier series

16) Obtain the fourier series for $f(x) = \dfrac{(\pi - x)^2}{4}$ in the interval $(o, 2\pi)$ and hence deduce that $\dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{3^2} + \dots = \dfrac{\pi^2}{6}$

17) a) A page is opened at random from a book containing 200 pages. What is the probability that the number on the page is a perfect square?

    b) A card is drawn art random from a pack of 52 cards. What is the probability that the drawn card is neither a heart nor a king?

18) a) State addition & multiplication theorems on probability for two events.

    b) An urn contrains 7 red and 3 black balls. Two balls are drawn from the urn without replacement. What is the probability that the second ball is red, if it is known that the first ball drawn is red?