4401

BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS - III

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions : 1. Answer **All** questions.

2. Each question carries **Three** marks.

3. Answer should be brief and straight to the point and shall not exceed

five simple sentences.

1. Solve: $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + 4y = 0$

2. Solve $\dfrac{d^3y}{dx^3} - 7\dfrac{d^2y}{dx^2} + 16\dfrac{dy}{dx} - 12y = 0$

3. Find the particular integral of $(D^2 + 4)\ y = \sin 3x$

4. Find the Laplace transform of sin6t cos2t

5. Find the Laplace transform of $\sin^2 t$

6. Evaluate $L\left\{\dfrac{sint}{t}\right\}$

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

8. Write the Fourier series for the function f(x) defined in the interval $(C, C + 2\pi)$

9. Find the Fourier coefficient a_0 for $f(x) = e^x$ in $0<x<2\pi$

10. A bag contains 5 black, 7 red and 3 white balls. A ball is drawn in random. Find the probability that the ball drawn is red.

PART-B

Instructions : 1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. (a) Solve : $(D^2 - 4) y = e^{3x}$

    (b) Solve : $(D^2 + D + 1) y = 2 \sin 3x$

12. (a) Solve: $(D^2 - 4D + 4) y = x^3$

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

13. (a) Evaluate $L \left(\frac{1 - \cos t}{t} \right)$

    (b) Evaluate $(\int_0^\infty t \, e^{-t} \sin t \, dt)$

14. Use Laplace transform method to solve $\frac{d^2 y}{dt^2} + y = t$, given that $y(0) = 1$, $y^1 (0) = -2$

15. Expand $f(x) = x$ as a Fourier series in the interval $0 < x < 2\pi$

16. Find the half-range cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$ and hence find the sum of the series

    $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\ldots\ldots\ldots$

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

18. Bag I contains 3 red and 4 black balls, while another bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from bag II

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