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C16-C-**401**

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BOARD DIPLOMA EXAMINATION, (C-16)
OCTOBER/NOVEMBER-2018
DCE - FOURTH SEMESTER EXAMINATION

ENGINEERING MATHEMATICS - IV

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 $y^{||} - 40y^{|} + 111y = 0$
2. Solve $(D^2 + 4)y = 0$
3. Solve $(D^3 - 1)y = 0$
4. Find the particular integral of $(D^2 + 4D + 4)y = e^{3x}$
5. Find the particular integral of $(D^2 - 1)y = x$
6. Find $L\{ e^{3t} - e^{-3t}\}$
7. Find $L\{ t^3 e^{-2t} \}$
8. Find $L^{-1}\{ \frac{1}{(S-a)^n}\}$
9. Write down the formulae for finding Fourier constants for f(x) in $[-\pi, \pi]$
10. Find the value of b_n in $f(x) = \cos x$ in $(-\pi, \pi)$ by Fourier series.

PART-B

10X5=50

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 $(D^2 + 1)y = 3 + 5e^x$

    (b) Solve $(D^2 - 3D + 2)y = \cos 3x$

12. (a) Solve $(D^2 - 4D + 3)y = e^{2x} - \sin 3x$

    (b) Solve $(D^2 - 4)y = 2x^3$

13. (a) Find L $\{e^{-2t} \sin 5t \cos 3t\}$

    (b) Find L $\{t \sin 3t\}$

14. (a) Find L $\left\{\frac{e^{-3t} - e^{-4t}}{t}\right\}$

    (b) Evaluate $\int_0^\infty e^{-4t} \sin 3t \, dt$ using Laplace transform technique

15. (a) Find $L^{-1}\left\{\frac{1}{S(S^2+1)}\right\}$

    (b) Using convolution theorem find $L^{-1}\left\{\frac{1}{(s+1)(s+2)}\right\}$

16. Solve the differential equation $y'' + 2y' - 3y = e^{-t}$, if $y(0) = y'(0) = 0$ by using Laplace Transform method

17. Find the Fourier series of $f(x) = x + x^2$ in the interval $(-\pi, \pi)$

18. Find the Fourier series to represent the function $f(x) = |\sin x|$, $-\pi < x < \pi$

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