



A/(C14AA)C/CH/CM/EC/EE/EI/IT/M/MET/MNG/PKG-401-/FW-**501**

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BOARD DIPLOMA SUPPLEMENTARY EXAMINATION, (C-16/C-16S)

DECEMBER - 2020

COMMON - IV SEMESTER EXAMINATION

ENGINEERING MATHEMATICS - IV

Time : 2 Hours

[Total Marks : **80**

PART - A

5×6=30

- Instructions :** (1) Answer any SIX questions.
(2) Each question carries **FIVE** marks.
(3) Each Answer should not exceed more than **ONE** page.

1 Solve : $(D^2 + 4D + 4)Y = 0$

2 Solve : $y'' + 16y = 0$

3 Solve : $(D^3 + 3D^2 - 4)Y = 0$

4 Find the complementary function of $(D^2 + 1)Y = e^{-x} + \sin x$.

5 Find the particular integral of $(D^2 + 5D + 6)Y = 5e^{2x}$.

6 Find the Laplace transform of $t^2 + at + b$.

7 Find the Laplace transform of $t^3 \cdot e^{2t}$.

8 Find $L^{-1}\left\{\frac{s^2 - 3s + 4}{s^3}\right\}$

9 Define Fourier Series of the function $f(x)$ in the interval $(c, c + 2\pi)$.

10 Find the value of a_0 for $f(x) = x$ in $(0, 2\pi)$.

601

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[Contd..

PART - B

$10 \times 5 = 50$

- Instructions :** (1) Answer any **FIVE** questions.
 (2) Each question carries **TEN** marks.
 (3) Each Answer should not exceed more than **TWO** pages.

11 (a) Solve : $(D^2 - 4D + 4)Y = e^x + \cos 2x$.

(b) Solve : $(D^2 + 6D + 5)Y = e^{-x} + e^{-5x}$

12 (a) Solve : $(D^2 + 25)Y = \sin 5x + \cos 5x + 5$

(b) Solve : $(D^2 + 1)Y = x^2 + 2x + 1$.

13 (a) Find : $L\{\cos 3t \cdot \sin 2t\}$

(b) Find : $L\left\{\frac{\sin t}{t}\right\}$

14 (a) Find : $L\left\{\int_0^t e^{-s} \sin t \cdot dt\right\}$

(b) Evaluate : $\int_0^t e^{-4t} \cos 3t \cdot dt$ using Laplace transformation.

15 (a) Find $L^{-1}\left\{\frac{1}{(s+1)(s+2)}\right\}$ using convolution theorem.

(b) Solve : $L^{-1}\left\{\frac{1}{s^2 + 6s + 5}\right\}$

16 (a) Solve $y'' + y = 0$ with $y(0) = 0$ and $y'(0) = 2$ using Laplace transform method.

(b) Solve $4y'' + \pi^2 y = 0$, $y(0) = 2$, $y'(0) = 0$ using Laplace transform.

17 Find the Fourier series for $f(x) = |\cos x|$ in the interval $(-\pi, \pi)$.

18 Obtain the Fourier Series for $f(x) = x^2$ in the interval $(0, 2\pi)$.
