



C16-COMMON-301

6201

BOARD DIPLOMA EXAMINATION, (C-16)

JUNE/JULY—2022

THIRD SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS – II

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **three** marks.

1. Evaluate $\int (e^x + \cos x - x^2) dx$

2. Evaluate $\int \frac{(\log x)^2}{x} dx$

3. Evaluate $\int_0^1 (x^2 + 2x + 1) dx$

4. Find the area bounded by the parabola $y = 4x^2$, x -axis between the lines $x = 1$ and $x = 2$.

* 5. Find the Laplace Transform of $(t^2 + e^{2t} + 1)$.

6. Find $L^{-1} \left[\frac{s}{s^2 - 16} \right]$.

7. Find the coefficient a_0 in Fourier Series expansion of the function $f(x) = x^2$ over $[0, 2\pi]$.
8. Find the differential equation corresponding to $y = A \sin 5x$, where A is any arbitrary constant.
9. Solve $\frac{dy}{dx} = \frac{1+x}{1+y}$
10. Solve $(D^2 + 2D + 1)y = 0$

PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
 (2) Each question carries **ten** marks.

11. (a) Evaluate $\int \frac{1}{x^2 + 2x + 5} dx$

(b) Evaluate $\int \frac{1}{5 - 4 \cos x} dx$

12. (a) Evaluate $\int x \log x dx$

(b) Evaluate $\int_0^{\frac{\pi}{2}} \log(\cot x) dx$

13. (a) Find RMS value of a function $y = \sqrt{8 - 4x^2}$ over a range $x = 0$ to $x = 2$.

(b) Find the volume of the solid of revolution of the area between the curve $y = x^2 + 3$, $x = 1$ and $x = 2$ about x -axis.

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14. (a) Obtain the approximate value of $\int_4^8 \frac{1}{x} dx$ by dividing the interval [4, 8] into 4 equal parts using Simpson's Rule.
 (b) Find $L(\sin 3t - 2 \cos 2t + \sinh 2t + 2 \cosh 3t)$
- 15.** (a) Find $L^{-1}\left[\frac{1}{s(s+2)}\right]$
 (b) Find $L^{-1}\left[\frac{s}{(s-3)^5}\right]$.
- 16.** Find the Fourier series for $f(x) = x$ in the interval $(-\pi, \pi)$.
- 17.** (a) Solve $\frac{dy}{dx} + \frac{y}{x} = x$
 (b) Solve $(ax + hy + g) dx + (hx + by + f) dy = 0$
- 18.** (a) Solve $(D^2 - D - 12)y = e^{3x}$
 (b) Solve $(D^2 + 4)y = \sin 3x$
