



C16-C-301/C16-CM-301/C16-IT-301

6222

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

DCE—THIRD SEMESTER 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

$$\int \sqrt{1 - \sin 2x} \, dx$$

2. Evaluate

$$\int \frac{e^{m \tan^{-1} x}}{1 + x^2} \, dx$$

3. Evaluate

$$\int_0^1 (x^3 - 1) \, dx$$

4. Find the area bounded by the parabola $y^2 = x^2$ and the line $x = 2$.

5. Find $L\{t^3 - 3t - 5\}$.

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6. Find

$$L^{-1} \left[\frac{6}{s^4} - \frac{1}{s} - \frac{1}{s^2} \right]$$

7. Find the value of a_1 , in Fourier series expansion of $f(x) = x$ in the interval of $(0, 2)$.

8. Find the differential equation of the family of curves $y = A \cos^3 x + B \sin^3 x$, where A, B are arbitrary constants.

9. Solve

$$\frac{dy}{dx} = e^y - x^2 e^y$$

10. Solve

$$\frac{d^2y}{dx^2} + 8 \frac{dy}{dx} + 12y = 0$$

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

11. (a) Evaluate

$$\int \frac{1}{5 - 3 \cos x} dx$$

(b) Evaluate

$$\int \frac{3x - 1}{(x - 1)(x - 2)} dx$$

12. (a) Evaluate

$$\int x^2 \cos 3x dx$$

(b) Evaluate

$$\int_0^{\pi/2} \frac{\sin^8 x}{\cos^8 x + \sin^8 x} dx$$

- * **13.** (a) Find the RMS value of $\sqrt{8 - 4x^2}$ between $x = 0$ and $x = 2$.
 (b) Find the volume generated when the area bounded by $y^2 = x^3$ and $x = 4$ revolves about X-axis.

- 14.** (a) Evaluate $\int_0^1 \frac{1}{x^2} dx$ using Simpson's rule by dividing the interval $[0, 1]$ into eight equal intervals.

(b) Find

$$L \frac{e^{at} \cos bt}{t}$$

- 15.** (a) Find

$$L^{-1} \frac{1}{s(s^2 - 9)}$$

(b) Using convolution theorem, find

$$L^{-1} \frac{s}{(s^2 - 1)^2}$$

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

- 17.** (a) Solve

$$(e^y - 1) \cos x \, dx - e^y \sin x \, dy = 0$$

(b) Solve

$$\frac{dy}{dx} = \frac{y}{x} - \frac{y^2}{x^2}$$

- * **18.** (a) Solve

$$(D^2 - 4D - 4)y = e^x \cos 2x$$

(b) Solve

$$(D^2 - 1)y = x$$
