



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

6222

BOARD DIPLOMA EXAMINATION, (C-16)

JUNE—2019

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 :

$$\int (x^5 + 5^x + 5x) dx$$

2. Evaluate :

$$\int \frac{1}{\sqrt{4-x^2}} dx$$

3. Evaluate :

$$\int_0^1 \frac{1}{1+x^2} dx$$

4. State the formula to find the area bounded by the curve $y = f(x)$, x -axis between the lines $x = a$ and $x = b$.

- * 5. Find $L\{(t+2)^2\}$.
6. Find $L^{-1}\left(\frac{2}{s-4} + \frac{1}{s^2+9}\right)$.
7. Find the value of a_1 in Fourier series expansion of $f(x) = x$ in the interval $(0, 2\pi)$.
8. Find the differential equation of the family of parabolas $y^2 = 4ax$, where a is arbitrary constant.
9. Solve $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$.
10. Solve $(D^2 + 4D + 13)y = 0$.

PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \sin 5x \cos 4x \, dx$$

- * (b) Evaluate :

$$\int \frac{1}{5 + 4 \cos x} \, dx$$

12. (a) Evaluate :

$$\int x \tan^{-1} x \, dx$$

- (b) Evaluate :

$$\int_0^{\pi/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x} + \sqrt{\cot x}} \, dx$$

13. (a) Find the volume of the solid obtained by revolving the curve $x^2 = y - 3$ about x -axis from $x = 1$ to $x = 3$.

- (b) Find the RMS value of $\sqrt{8 - 4x^2}$ between $x = 0$ to $x = 2$.

14. (a) Obtain the value of $\int_0^1 \frac{1}{1+x^2} \, dx$ using Simpson's rule by dividing $(0, 1)$ into four equal parts and hence find the approximate value of π .

- (b) Find $L \{e^{2t} \cos 3t\}$.

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

- (b) Define convolution theorem, find $L^{-1} \left\{ \frac{1}{(s+a)(s+b)} \right\}$.

16. Obtain the Fourier series for the function $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$.

17. (a) Solve $(x^3 + 3xy^2) \, dx + (3x^2y + y^3) \, dy = 0$.

- (b) Solve $\frac{dy}{dx} + \frac{3y}{x} = \frac{1}{x^4}$.

18. (a) Solve $(D^2 - 7D + 6)y = e^{2x}$.

- (b) Solve $(D^2 + 2D + 1)y = x + \sin x$.

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