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

6222

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2017

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.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Evaluate

$$(x^5 - 5^x - 5x) dx$$

2. Evaluate

$$\frac{14x - 11}{7x^2 - 11x + 1} dx$$

3. Evaluate

$$\int_0^{\pi/2} \sin^2 x \cdot dx$$

4. Find the mean value of the ordinate of $y^2 = 8x$ from $x = 0$ and $x = 3$.

5. Find the Laplace transform of $t^2 e^{-3t}$.

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6. Find

$$L^{-1} \frac{1}{(s-1)^3}$$

7. Find the Fourier constant a_0 for $x \sin x$ in $(-\pi, \pi)$.

8. Find the differential equation of the family of parabolas $y^2 = 4ax$.

9. Solve

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

10. Solve

$$\frac{d^2y}{dx^2} + 10 \frac{dy}{dx} + 25y = 0$$

PART—B

10×5=50

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

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

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Evaluate

$$\int_0^{\pi/2} \cos^3 x \sin^5 x \, dx$$

(b) Evaluate

$$\int \frac{1}{x^2 + 4x + 13} \, dx$$

12. (a) Evaluate

$$\int_0^{\pi/2} x^2 \cos \frac{5x}{4} \, dx$$

(b) Evaluate

$$\int_0^{\pi/2} \frac{1}{1 + \tan x} \, dx$$

- * **13.** (a) Find the area enclosed by the parabola $y = x^2$ and the line $y = 3x - 4$.

- (b) Find the volume of the solid obtained by revolving the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ about x -axis.

- 14.** (a) Find

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

- (b) Evaluate

$$\int_1^{11} x^3 dx$$

using trapezoidal rule by taking $n = 10$.

- 15.** (a) Find

$$L\{t^3 e^{2t}\}$$

- (b) Find

$$L^{-1} \frac{1}{s(s^2 - 4)},$$

using convolution theorem.

- 16.** Express $f(x) = x - x^2$ as Fourier series in $x \in (-\pi, \pi)$.

- 17.** (a) Solve,

$$\frac{dy}{dx} - \frac{2y}{x} = \frac{1}{x^2}$$

- (b) Solve

$$(D^2 - 5D - 6)y = e^{3x} - 3e^{3x}$$

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

$$(D^2 - D - 1)y = 2 \sin 3x$$

- (b) Solve,

$$(D^2 - D - 6)y = x$$
