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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

$$(x^5 \quad 5^x \quad 5x)\ dx$$

2. Evaluate

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

3. Evaluate

$$\int_0^{/2} \sin^2 x.dx$$

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

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

6. Find

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

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

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

$$\int \cos^3 x \sin^5 x \, dx$$

(b) Evaluate

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

12. *(a)* Evaluate

$$\int x^2 \cos\left(\frac{5-x}{4}\right) dx$$

(b) Evaluate

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

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

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

14. *(a)* Find

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

(b) Evaluate

$$\int_{1}^{11} x^3 \ dx$$

using trapezoidal rule by taking $n \quad 10$.

15. *(a)* Find

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

(b) Find

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

using convolution theorem.

16. Express $f(x) \quad x \quad x^2$ as Fourier series in $x \quad x$.

17. *(a)* Solve,

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

(b) Solve

$$(D^2 \quad 5D \quad 6)\, y \quad e^{3x} \quad 3^{\ 3x}$$

18. *(a)* Solve,

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

(b) Solve,

$$(D^2 \quad D \quad 6)y \quad x$$

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