



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

6222

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2018

DCE—THIRD SEMESTER EXAMINATION

ENGINEERING MATHEMATICS-II

Time : 3 hours ]

[ Total Marks : 80

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

2. Evaluate  $\int \frac{\cos \log x}{x} dx$ .

3. Evaluate  $\int_0^{\frac{\pi}{2}} \sin^2 x . dx$ .

4. Find the RMS value of  $\sqrt{27 - x^2}$  over the interval (0, 3).

5. Find  $L(t^2 - 1)^2$ .

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6. Find  $L^{-1} \frac{2s-5}{(s-2)^2-4}$ .
7. Find  $a_0$  in the Fourier series expansion of  $F(x) = e^x$  in the interval  $(-\pi, \pi)$ .
8. Solve  $(e^x - 1) \sin y \, dy + e^x \cos y \, dx = 0$ .
9. Solve  $(D^2 - 3D - 5)y = 0$ .
10. Form differential equation for the family of curves  $y = Ae^{2x} + Be^{-2x}$ .

**PART—B**

10×5=50

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

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

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

11. (a) Evaluate  $\int \sin 5x \cdot \cos 7x \, dx$ .

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

12. (a) Evaluate  $\int x^3 e^{5x} \, dx$ .

(b) Evaluate  $\int_0^{\frac{\pi}{2}} \frac{\sin^{12} x}{\sin^{12} x + \cos^{12} x} \, dx$ .

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13. (a) Find the area bounded between the parabolas  $y^2 = 16x$  and  $x^2 = 16y$ .

(b) Find the volume of the solid generated when the region of the circle  $x^2 + y^2 = 16$  is revolved about a diameter.

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- 14.** (a) A curve is drawn to pass through the points given by the following table :

$x$	1	1.5	2	2.5	3	3.5	4
$y$	3	3.4	3.7	2.8	2.7	2.6	2.1

Calculate the area bounded by the curve,  $x$ -axis and the lines  $x = 1$   $x = 4$  using trapezoidal rule.

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

**15.** (a) Find  $L \frac{e^{2t} - e^{3t}}{t}$ .

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

- 16.** Obtain the Fourier half range Cosine series and Sine series for  $f(x) = x$  in the interval  $(0, \pi)$ .

**17.** (a) Solve  $x \frac{dy}{dx} - 2y = x^2 \log x$ .

(b) Solve  $(x^2 - y^2 - a^2)x dx + (x^2 - y^2 - b^2)y dy = 0$ .

**18.** (a) Solve  $(D^2 - 3D - 2)y = \cos 3x$ , where  $D = \frac{d}{dx}$ .

(b) Solve  $(D^2 - 3D - 2)y = x^2$ , where  $D = \frac{d}{dx}$ .

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