



CI6-EC-301/C16-CHPC-301/C16-PCT-301

6232

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

DECE—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.

1. Evaluate  $\int (ax + \frac{b}{x} + c\sqrt{x})dx$ .

2. Evaluate  $\int x \cos x dx$ .

3. Find the value of  $\int_1^{\sqrt{1-x^2}} \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$ .

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

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5. Find  $L(t^3 - 3e^{-t} \cosh 2t)$ .

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

7. Define the Fourier coefficient  $a_1$  for the function  $f(x) = k$ , constant, in the interval  $(0, 2\pi)$ .

8. Find the differential equation corresponding to  $y = mx + 1$ , eliminating the parameter  $m$ .

9. Solve  $(x+1)dy - (y+1)dx = 0$ .

10. Solve  $(D^2 - D - 12)y = 0$ .

**PART—B**

10×5=50

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

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

11. Find the following :

(a)  $\int \frac{\cos x}{1 - \sin^2 x} dx$

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

12. (a) Evaluate  $\int \sin^2 x \cos^3 x dx$ .

(b) Evaluate  $\int_0^1 \frac{1}{(x+1)(x+2)} dx$ .

- \* **13.** (a) Find the RMS value of  $3\sqrt{16-x^2}$  from  $x = -3$  to  $x = 2$ .
- (b) Find the volume of the solid obtained by revolving the ellipse  $\frac{x^2}{64} + \frac{y^2}{16} = 1$  about  $x$ -axis.

- 14.** (a) Evaluate  $\int_0^1 \frac{1}{x^2} dx$  using Simpson's rule taking six equal intervals.

(b) Find  $L(t \cos 2t)$ .

- 15.** (a) Find  $L^{-1} \frac{s-2}{(s-1)(s-3)}$ .

(b) Using convolution theorem, find

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

- 16.** Find the Fourier coefficients of the function  $x^2 - x$  in the interval  $(-\pi, \pi)$ .

- 17.** Solve the following :

(a)  $\frac{dy}{dx} = \frac{y-x}{y+x}$

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

- \* **18.** Solve completely  $(4D^2 - 4D - 1)y = e^x \cos x - x$ .

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