



C16-M-301/C16-CHOT-301/C16-RAC-301

6242

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2018

DME—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  $\int \sin x \frac{1}{1+x^2} e^x dx$ .

2. Evaluate  $\int \frac{\cos^{-1} x}{\sqrt{1-x^2}} dx$ .

3. Evaluate  $\int_0^{\pi/4} \sec^2 x dx$ .

4. Find the area bounded by the parabola  $y = x^2$ , X-axis, between the lines  $x = 2$  and  $x = 3$ .

5. Find  $L\{e^{2t} + 4t^3 + 2 \sin 3t\}$ .

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6. Find  $L^{-1} \frac{2s+5}{s^2+4}$ .

7. Find the value of  $a_0$  in Fourier series expansion of  $f(x) = x^2$  in the interval  $(0, 2\pi)$ .

8. Find the differential equation corresponding to the family of curve  $y = Ae^{5x} + Be^{-5x}$ , where  $A, B$  are arbitrary constants.

9. Solve  $\frac{dy}{dx} \sqrt{\frac{1-y^2}{1-x^2}} = 0$ .

10. Solve  $(D^2 - 6D + 4)y = 0$

**PART—B**

10×5=50

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

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

11. (a) Evaluate  $\int \frac{1}{\sqrt{x-2}\sqrt{x-3}} dx$ .

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

12. (a) Evaluate  $\int x^3 e^{2x} dx$ .

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

13. (a) Find the RMS value of  $\sqrt{8-4x^2}$  over the range between  $x = 0$  to  $x = 3$ .

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

- 14.** (a) Evaluate  $\int_0^1 \frac{1}{x^2} dx$  using trapezoidal rule by taking  $n = 4$ .  
 (b) Find  $L\{t^2 e^t\}$ .
- 15.** (a) Find  $L^{-1} \frac{s}{s^2 - 3}$   
 (b) Using convolution theorem, find  $L^{-1} \frac{1}{(s-1)(s-2)}$ .
- 16.** Expand the function  $f(x) = x^2$  as a Fourier series in  $[-\pi, \pi]$ .
- 17.** (a) Solve  $\frac{dy}{dx} - \frac{y}{x} = 8$ .  
 (b) Solve  $(e^y - 1)\cos x dx - e^y \sin x dy = 0$ .
- 18.** (a) Solve  $(D^2 - D - 6)y = e^{3x} - e^{-3x}$ .  
 (b) Solve  $(D^2 + 25)y = \sin 5x$ .

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