



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

6232

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2017

DECE—THIRD SEMESTER EXAMINATION

ENGINEERING MACHEMATICS-II

Time : 3 hours ]

[ Total Marks : 100

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**PART—A**

3×10=40

- 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,  $\frac{1}{1 + \sin x} \cdot dx$

2. Evaluate,  $\frac{m_e \tan^{-1} x}{1 + x^2} dx$

3. Evaluate,  $\int_0^1 \frac{1}{x^2 + 1} \cdot dx$

4. Find the mean value of  $y = \sin x$  over  $0, \pi$

5. Find the Laplace Transform of  $3 \cdot \sin 4t - 4 \cos 3t$ .

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

7. Define the Fourier series of  $f(x)$  in the interval  $(c, c+2)$

8. Find the differential equation to the family of curves  $y = A \cos 3x + B \sin 3x$  where A, B are arbitrary constants.

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

10. Solve,  $\frac{d^2y}{dx^2} + 4 \frac{dy}{dx} - 13y = 0$

**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,  $\int \cos 3x \cdot \sin 2x \cdot dx$

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

12. (a) Evaluate,  $\int x^3 \cdot \log x \cdot dx$

(b) Evaluate,  $\int_0^{1/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} \sqrt{\cos x}} \cdot dx$

13. (a) Find the area enclosed by the ellipse  $16x^2 + 25y^2 = 400$

(b) Find the volume of the sphere of radius 'r' using the method of integration.

\* 14. (a) Find  $L e^{2t} \cdot t \sin 3t$

(b) Obtain the value of  $\int_0^6 \frac{1}{x^2} \cdot dx$  using Simpson's rule by taking  $n = 6$ .

15. (a) Find  $L \frac{1 - \cos 2t}{t}$

(b) Find  $L^{-1} \log \frac{s+3}{s-2}$

16. Expand  $f(x) = x^2$  as Fourier series in  $l < x < l$ .

Hence, deduce that  $\frac{2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \dots$

17. (a) Solve,  $(1 - x^2) \frac{dy}{dx} - 2xy = x^3$ .

(b) Solve,  $D^2 y - 1 = \cosh 2x$ .

18. (a) Solve,  $(D^2 - 3D + 2)y = \cos 3x$ .

(b) Solve,  $(D^2 - 2D + 1)y = 2x^2$ .

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