



C14-EC-301/C14-CHPC-301/C14-PCT-301

4237

BOARD DIPLOMA EXAMINATION, (C-14)  
MARCH/APRIL—2016  
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 :

$$\left( e^x + 8 \sin x + \frac{6}{\sqrt{1-x^2}} \right) dx$$

2. Evaluate :

$$\frac{8x + 14}{4x^2 + 14x + 5} dx$$

3. Evaluate :

$$\frac{(\tan^{-1} x)^2}{1-x^2} dx$$

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4. Evaluate :

$$\frac{1}{2} \frac{1}{\sqrt{1-x^2}} dx$$

5. Find the area of region bounded by the parabola  $y = x^2$ ,  $x$ -axis and the line  $x = 4$ .

6. Find the differential equation of family of curves  $y = Ae^x + Be^{-x}$ , where  $A, B$  are arbitrary constants.

7. Solve :

$$\frac{dy}{dx} \sqrt{1-y^2} = 0$$

8. Solve :

$$\frac{dy}{dx} = \frac{y}{x} + 8$$

9. Find the arithmetic mean and mean deviation from the mean of 14, 16, 19, 20, 21, 27, 23.

10. Find the quartile deviation of the monthly income of 7 workers are given in rupees as 350, 840, 650, 710, 980, 575, 290.

### PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\frac{1}{x^2 - 2x - 5} dx$$

(b) Evaluate :

$$\frac{1}{5 - 4 \sin x} dx$$

\* **12.** (a) Evaluate :

$$\frac{x}{x^2 - 3x - 2} dx$$

(b) Evaluate :

$$e^x (\tan x - \log \sec x) dx$$

**13.** (a) Evaluate :

$$x^2 e^{-4x} dx$$

(b) Evaluate :

$$\int_0^{\pi/2} \log \tan x dx$$

**14.** (a) Find the area enclosed by the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

(b) Find the volume of the solid formed by revolving the area enclosed by the curve  $y = x^3$ , the  $y$ -axis and the lines  $y = 8$ ,  $y = 0$  about  $y$ -axis.

**15.** (a) Find the RMS value of  $\sqrt{8 - 4x^2}$  between  $x = 0$  and  $x = 2$ .

(b) Calculate the approximate value of  $\int_3^3 x^4 dx$  using Simpson's rule by dividing  $[3, 3]$  into six equal parts.

\* **16.** (a) Solve :

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

(b) Solve :

$$(x^3 - 3xy^2)dx - (3x^2y - y^3)dy = 0$$

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17. (a) Solve :

$$\frac{dy}{dx} = y \tan x - \sec x$$

(b) Solve :

$$y^2 dx + (xy - x^2) dy = 0$$

18. (a) Find the standard deviation of the following data :

Size of Item	10	11	12	13	14	15	16
Frequency	2	7	11	15	10	4	1

(b) Find the rank correlation coefficient of the following data :

$x$	22	15	17	19	20	24
$y$	76	84	81	77	80	78

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