



C14-C-301/C14-CM-301

4225

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

$$\int (x^9 e^x + \frac{5}{x}) dx$$

2. Evaluate :

$$\int \frac{e^{\sqrt{x}} \sin e^{\sqrt{x}}}{2\sqrt{x}} dx$$

3. Evaluate :

$$\int \frac{1}{x(1 + \log x)^5} dx$$

4. Evaluate :

$$\int_1^1 (x^2 + 3x - 2) dx$$

5. Find the area of the region bounded by the parabola  $y = x^2$ ,  $x$ -axis between the lines  $x = 2$  and  $x = 3$  about the  $x$ -axis.

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6. Form a differential equation by eliminating the arbitrary constants  $c$ , from the equation  $\sin^{-1} x = \sin^{-1} y + c$ .

7. Solve :

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

8. Solve :

$$\frac{dy}{dx} = y e^{-x}$$

9. Find the mean deviation from median of the following discrete data :

6, 10, 7, 12, 4, 13, 12, 16

10. Find the mean, variance and standard deviation for the following data :

6, 7, 10, 12, 13, 4, 12, 8

### PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \frac{3x-1}{x^2-2x-3} dx$$

(b) Evaluate :

$$\int \frac{1}{\sqrt{x^2-2x-3}} dx$$

12. (a) Evaluate :

$$\int \frac{1}{3 \cos x - 4 \sin x - 6} dx$$

(b) Evaluate :

$$\int \cos 7x \cdot \sin 2x dx$$

13. (a) Evaluate\*

$$\int x^3 e^{2x} dx$$

by making use of Bernoulli's theorem.

(b) Evaluate :

$$\int_0^{1/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x} \sqrt{\cot x}} dx$$

14. (a) Find the area enclosed by the curve  $9x^2 + 4y^2 = 36$ .

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

15. (a) Find the RMS value of the current  $I = a \sin x$  over a half wave.

(b) Evaluate

$$\int_4^8 \frac{1}{x} dx$$

approximately by dividing the interval  $[4, 8]$  into four equal parts using trapezoidal rule.

16. Solve :

$$(x^2 - y^2)dx - 2xy dy$$

17. (a) Solve :

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

(b) Solve :

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

18. The following table shows the marks obtained by six students in Chemistry and Physics :

Marks in Chemistry	:	9	16	18	15	21	12
Marks in Physics	:	14	17	13	13	16	15

Calculate the correlation coefficient.

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