



C14-C-301/C14-CM-301

4225

**BOARD DIPLOMA EXAMINATION, (C-14)**  
**MARCH/APRIL—2017**  
**DCE—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 :

$$(e^{a \log x} e^{x \log a}) dx$$

2. Evaluate :

$$\frac{e^{\tan^{-1} x}}{1+x^2} dx$$

3. Evaluate :

$$\frac{1}{1+\tan x} dx$$

4. Evaluate :

$$\int_0^1 \frac{x^3}{1-x^8} dx$$

5. Find the mean value of  $\sin^3 x$  from  $x = 0$  to  $x = 2$ .

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6. Find the differential equation of all circles passing through the origin and having their centres on the X-axis.

7. Solve :

$$\frac{dy}{dx} = \frac{y(2x - 5)}{2x^2}$$

8. Solve :

$$(\cos x - x \cos y)dy - (\sin y - y \sin x)dx = 0$$

9. Find the mean and mode of the numbers :

4, 3, 2, 5, 3, 4, 5, 1, 7, 3, 2, 1

10. State the merits and demerits of quartile deviation.

### PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \frac{x}{x^2 - 8x + 12} dx$$

(b) Evaluate :

$$\int \sin^4 x dx$$

12. (a) Evaluate :

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

(b) Evaluate :

$$\int \sin^3 x \cos^3 x dx$$

- \* 13. (a) Evaluate

$$x^2 e^{5x} dx$$

- (b) Evaluate :

$$\int_0^{\pi/2} \frac{1}{1 + \cot x} dx$$

14. (a) Find the area bounded by the curve  $4x^2 + 9y^2 = 36$  using the method of integration.

- (b) Find the RMS value of  $\log x$  over the range  $x = 1$  to  $x = e$ .

15. (a) Find the volume of a right circular cone of height  $h$  and base radius  $r$  using integration.

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

16. Solve :

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

17. (a) Solve :

$$\frac{dy}{dx} = \frac{2x - y + 1}{x + 2y - 3}$$

- (b) Solve :

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

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

$x$  : 6      7      8      9      10      11      12

$y$  : 3      6      9      13      8      5      4

- (b) In a contest, two judges ranked eight candidates A, B, C, D, E, F, G and H in order of their performance, as shown in the following table. Find the rank correlation coefficient :

Students	A	B	C	D	E	F	G	H
Judge—I	5	2	8	1	4	6	3	7
Judge—II	4	5	7	3	2	8	1	6

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