



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

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 :

$$\frac{1 - \tan d}{1 + \tan d}$$

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 $x = 2$.

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 *

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

(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
