



C14-M-301/C14-CHOT-301/C14-RAC-301

4249

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2016

DME—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 :

$$(x^a - a^x - ax) dx$$

2. Evaluate :

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

3. Evaluate :

$$\log x dx$$

4. Evaluate :

$$\int_0^{\pi/2} \frac{1}{\sqrt{1-\sin 2x}} dx$$

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5. Find the area bounded by the parabola  $y^2 = 8x$ ,  $y$ -axis and the lines  $y = 2$  and  $y = 6$ .

6. Find the differential equation by eliminating the arbitrary constants  $A, B$  from the equation  $y = Ae^{3x} + Be^{-3x}$ .

7. Solve :

$$\sec^2 x \tan y \, dx - \sec^2 y \tan x \, dy = 0$$

8. Solve :

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

9. Find the arithmetic mean of 2, 7, 5, 14, 12, 9, 21.

10. Find the quartile deviation of the daily wages (in ₹) of 7 men given below :

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 :

$$(2 \sin x - 3 \cos x)^2 \, dx$$

(b) Evaluate :

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

12. (a) Evaluate <sup>\*</sup> :

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

(b) Evaluate :

$$\int \sin^3 x \cos^5 x dx$$

13. (a) Evaluate :

$$\int x^3 \sin 2x dx$$

(b) Evaluate :

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

14. (a) Find the area enclosed by the curve  $y = x^2 - 6x + 4$  and the line  $2x - y = 1$ .

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

15. (a) Find the volume of the solid generated by revolving the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$  about its major axis.

(b) Find the RMS value of  $xe^x$  as  $x$  varies from  $x = 1$  to  $x = 3$ .

<sup>\*</sup> 16. Solve :

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

17. (a) Solve :

$$\frac{dy}{dx} + \frac{y \cos x - \sin y}{x \cos y} = \frac{y}{x}$$

(b) Solve :

$$\frac{dy}{dx} = y \cot x - \cos x$$

18. (a) Write the merits, demerits and uses of standard deviation.

(b) The scores of 8 students in an examination in Physics and Chemistry are given below :

<i>Students</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>
<i>Physics</i>	70	48	58	55	54	50	60	52
<i>Chemistry</i>	62	47	53	60	55	68	51	48

Find the rank correlation coefficient.

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