C14–M–301/C14–CHOT–301/C14–RAC–**301**

4249

BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2017
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 :

   $$\int (x^a \quad a^x \quad ax)\,dx$$

2. Evaluate :

   $$\int \frac{\cos(\log x)}{x}\,dx$$

3. Evaluate :

   $$\int \frac{1}{\sqrt{16 \quad x^2}}\,dx$$

4. Evaluate :

   $$\int_0^1 (x^3 \quad 1)\,dx$$

5. Find the area enclosed by the parabola $y = x^2$, the X-axis and the lines $x = 3$ and $x = 5$.

6. Find the differential equation of the family of parabolas $y^2 = 4ax$.

7. Solve :

$$\frac{dy}{dx} = e^y + x^2 e^y$$

8. Solve :

$$\frac{dy}{dx} + \frac{y}{x} = 5$$

9. The weekly wages of 5 labourers are ₹ 40, ₹ 60, ₹ 36, ₹ 45, ₹ 25. Calculate their AM.

10. Define positive and negative correlation.

PART—B

10×5=50

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

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

11. *(a)* Evaluate :

$$\int \cos^3 \theta \sin^6 \theta \, d\theta$$

(b) Evaluate :

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

12. *(a)* Evaluate :

$$\int \frac{x}{x^2 - 12x + 35} dx$$

(b) Evaluate :

$$\int \frac{1}{1 + \cos x} dx$$

13. *(a)* Evaluate :

$$\int x^3 e^{4x} dx$$

(b) Evaluate :

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

14. *(a)* Find the area bounded by the parabola $4y = 3x^2$ and the line $2y = 3x + 12$.

(b) Find the RMS value of $\sqrt{27 - 4x^2}$ from $x = 0$ to $x = 3$.

15. *(a)* Find the volume generated by the revolution of the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$ about the major axis.

(b) Evaluate $\int_0^1 x^2 dx$ approximately by dividing the interval $(0, 1)$ into 10 equal subintervals using Simpson's rule.

16. Solve :

$$(x^2 - y^2)dx = 2xydy$$

17. *(a)* Solve :

$$(x^2 + y^2 + a^2)xdx + (x^2 + y^2 + b^2)ydy = 0$$

(b) Solve :

$$\frac{dy}{dx} + 2y\tan x = y^2$$

18. Find the variance and standard deviation for the following data :

Marks	10	20	30	40	50	60
No. of students	8	12	20	10	7	3

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