



C09-CM-302

3228

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2014

DCM—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 :

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

2. Evaluate :

$$(2x-3)^8 dx$$

3. Evaluate :

$$(x^5 + 5^x + 5x) dx$$

4. Evaluate :

$$\frac{dx}{\sqrt{25-x^2}}$$

5. Evaluate :

$$\frac{[1 + \log x]^5}{x} dx$$

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6. Write the formulae of the following :

$$\frac{1}{a^2} \frac{1}{x^2} dx, \quad \frac{1}{x^2} \frac{1}{a^2} dx, \quad \frac{1}{x^2} \frac{1}{a^2} dx$$

7. Evaluate :

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

8. Solve :

$$\frac{d^2y}{dx^2} - 8 \frac{dy}{dx} - 12y = 0$$

9. Solve :

$$y^2 dx - x^2 dy = 0$$

10. Form the differential equation of family of curves

$$y = A \cos 5x + B \sin 5x$$

where A, B are arbitrary constants.

PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \frac{(x - 7)}{(x - 3)(x - 2)} dx$$

(b) Evaluate :

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

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12. (a) Evaluate :

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

(b) Evaluate :

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

* **13.** (a) Find the RMS value of $\sqrt{\log x}$ over the range $x = 1$ to $x = e$.

(b) Find the volume of the sphere with radius r using the method of integration.

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

15. Solve :

$$(x^2 + y^2) \frac{dy}{dx} = xy$$

16. (a) Solve :

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

(b) $(D^2 - D - 6)y = e^{3x}$

17. (a) Solve :

$$(D^2 - 4)y = \cos^2 x$$

(b) Solve :

$$(D^2 - 4)y = x^2$$

18. (a) Use Simpson's rule to evaluate $\int_0^3 x^4 dx$ by taking seven equidistant ordinates.

* (b) Solve :

$$\cos x (e^y - 1) dx + e^y \sin x dy = 0$$

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