



C09-A-302/C09-AA-302/C09-AEI-302/C09-C-302/  
C09-CM-302/C09-EC-302/C09-EE-302/C09-CH-302/  
C09-CHPP-302/C09-CHPC-302/C09-CHOT-302/  
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**3202**

**BOARD DIPLOMA EXAMINATION, (C-09)**

**OCT/NOV—2016**

**THIRD SEMESTER (COMMON) 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.  
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Evaluate  $x^3 \cos(x^4) dx$ .

2. Evaluate  $\frac{1}{x(\log x)^2} dx$ .

3. Evaluate  $xe^x dx$ .

4. Evaluate  $\frac{1}{\cos^2 x \sin^2 x} dx$ .

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5. Evaluate  $\int \frac{dx}{\sqrt{x^2 - 9}}$ .
6. Evaluate  $\int \log x \, dx$ .
7. Evaluate  $\int_0^{\pi/3} \frac{\cos x}{4 - 3 \sin x} \, dx$ .
8. Find the particular integral of  $(D^2 - 4D - 4)y = e^{2x}$ .
9. Form the differential equation of family of curves  $y = A \cos x + B \sin x$  where  $A$  and  $B$  are arbitrary constants.
10. Solve  $x(1 - y^2) \, dx - y(1 - x^2) \, dy = 0$ .

**PART—B**

10×5=50

- Instructions :** (1) Answer *any five* questions.  
 (2) Each question carries **ten** marks.  
 (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Evaluate  $\int \frac{1}{x^2 - 2x - 10} \, dx$ .

(b) Evaluate  $\int \frac{x^4 - 1}{x^2 - 1} \, dx$ .

12. (a) Evaluate  $\int \frac{1}{x^2 - 8x - 20} \, dx$ .

(b) Evaluate  $\int \frac{1}{2 - \cos x} \, dx$ .

13. (a) Find the volume of the solid formed by revolving the area enclosed by the curve  $\sqrt{x} = \sqrt{y} = \sqrt{a}$  in the first quadrant about  $y$ -axis.

(b) Find the RMS value of  $xe^x$  between  $0 < x < 1$ .

14. (a) Evaluate\*

$$\int_{-\pi/4}^{\pi/4} \log \frac{1 + \sin x}{1 - \sin x} dx$$

(b) Find the area bounded by the parabola  $y^2 = 2x$  and the straight line  $4x - y - 1 = 0$ .

15. (a) Solve  $D^2 y + y = \cos 3x$ .

(b) Solve  $D^2 y - 2Dy + y = 2x^2$ .

16. (a) Solve

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

(b) Solve

$$(D^2 - D - 12)y = e^{4x}$$

17. Solve

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

18. (a) Evaluate\*

$$\int_1^2 \frac{1}{x} dx$$

approximately by dividing the interval  $[1, 2]$  into 10 equal parts using Simpson's rule.

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

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