



C09-A-302/C09-AA-302/C09-AEI-302/C09-C-302/
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BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2016

THIRD SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS-II

Time : 3 hours]

[Total Marks : 80

PART—A

$3 \times 10 = 30$

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

5. Evaluate $\frac{dx}{\sqrt{x^2 - 9}}$.
6. Evaluate $\log x \, dx$.
7. Evaluate $\int_0^3 \frac{\cos x}{4 - 3 \sin x} \, dx$.
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 $0 \leq x \leq 1$.

14. (a) Evaluate ^{*}

$$\int_4^4 \log \frac{1 \sin x}{1 \sin x} dx$$

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

15. (a) Solve $D^2 - 1 \cdot y - 1 = \cos 3x$.

(b) Solve $D^2 - 2D - 1 \cdot y = 2x^2$.

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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