



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/
C09-CHST-302/C09-IT-302/C09-M-302/C09-MET-302/
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3202

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—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.

1. Evaluate $\int x \cos x \, dx$.

2. Evaluate $\int x \cos x^2 \, dx$.

3. Evaluate $\int \frac{e^{m \tan^{-1} x}}{1+x^2} \, dx$.

4. Evaluate $\int \frac{1}{1+\cos x} \, dx$.

5. Evaluate $\int \frac{dx}{\sqrt{x^2 - 9}}$.
6. Find the mean value of the function between $f(x) = x^2 - 4x + 3$ values of x , where the expression vanishes.
7. Evaluate $\int xe^x dx$.
8. Solve $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 12y = 0$.
9. Find the differential equation whose solution is $y = Ae^x + Be^{2x}$, where A, B are arbitrary constants.
10. Solve $\frac{dy}{dx} = e^y - e^{-y}x^2$.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.

11. (a) Evaluate $\int \frac{2x - 3}{3x^2 - 14x + 5} dx$.
(b) Evaluate $\int x^3 \log x dx$.
12. (a) Evaluate $\int \cos^3 x \sin^4 x dx$.
(b) Evaluate $\int \cos 2x \cos x dx$.
13. (a) Find the volume of the solid formed by revolving the area enclosed by the curve $\sqrt{x} + \sqrt{y} = 1$, $x = 0$, $y = 0$ about y -axis.
(b) Find the RMS value of $\sqrt{27 - 4x^2}$ between $x = 0$, $x = 3$.

14. Find the area bounded by the curve $16x^2 + 25y^2 = 400$ using the method of integration.

15. (a) Solve $(D^2 - 6D - 9)y = \cos 3x$.

(b) Solve $(D^2 - 5D - 6)y = x$.

16. (a) Solve $\frac{dy}{dx} - \frac{2y}{x} = 3x$.

(b) Solve $(4D^2 - 4D - 3)y = e^{2x}$.

17. Solve $x^2 dy - (y^2 - xy) dx = 0$.

18. (a) A river is 80 feet wide and depth d (in feet) at a distance x from one bank is given by the following table :

x	0	10	20	30	40	50	60	70	80
d	0	4	7	9	12	15	14	8	3

Find the cross-section of the river using Simpson's rule.

(b) Solve $\frac{dy}{dx} - \frac{x - y + 1}{x + y}$.
