



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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BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2017

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

2. Evaluate $\frac{dx}{6 + 2x^3}$.

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

4. Evaluate $2x \cdot e^{x^2} dx$.

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5. Evaluate $\int e^x (\sin x + \cos x) dx$.

6. Find the mean value of the function $y = \sin x$ over $(0, \pi)$

7. Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{1 - \sin 2x} \cdot dx$.

8. Find the particular integral of $(D^2 - 16)y = \sin 4x$.

9. Form the differential equation of the family of curves $y = Ae^x + Be^{5x}$, where A, B are arbitrary constants.

10. Solve the following :

$$\sqrt{1 - y^2} dx + \sqrt{1 - x^2} dy = 0$$

PART—B

10×5=50

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

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

(3) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. (a) Evaluate $\int \frac{1}{x^2 + 2x + 5} dx$.

(b) Evaluate $\int \sin 3x \cos 2x dx$.

12. (a) Evaluate $\int \frac{\sec^2 x}{\sqrt{1 - \tan^2 x}} dx$.

(b) Evaluate $\int \frac{1}{5 - 4 \cos x} dx$.

13. (a) Find the ^{*} volume of the solid obtained by revolving the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about its major axis, where $a > b$.

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

14. (a) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin^{20} x}{\sin^{20} x + \cos^{20} x} dx$.

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

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

(b) $(D^2 - 2D - 8)y = e^{-3x}$

16. Solve $(x^2 - y^2)dx - 2xydy = 0$.

17. (a) Solve $(D^2 - 4)y = \cos x$.

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

* 18. (a) Given $e^0 = 1$, $e^1 = 2.72$, $e^2 = 7.39$, $e^3 = 20.09$ and $e^4 = 54.60$ verify Simpson's rule by finding the value of $\int_0^4 e^x dx$.

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