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C09-A-302/C09-AA-302/C09-AEI-302/C09-CH-302/
C09-CHST-302/C09-IT-302/C09-MET-302/
C09-MNG-302/C09-PKG-302/C09-TT-302

3202

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2013

THIRD SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS—II

Time : 3 hours] [*Total Marks* : 80

PART—A

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 :

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

2. Evaluate :

$$\int \frac{1}{\sqrt{9-x^2}}\, dx$$

3. Evaluate :

$$\int \sec(4x-7)\cdot\tan(4x-7)\, dx$$

4. Evaluate :

$$\int \frac{\sin(\log x)}{x}\, dx$$

5. Evaluate :

$$\int (x^3 + 3^x + 2)\, dx$$

6. Evaluate :

$$\int_0^1 (x^5 + 1)\, dx$$

7. Find the mean value of $y = x^2$ between $x = 2$ and $x = 3$.

8. Solve :

$$x^6 dy + y^6 dx = 0$$

9. Solve :

$$\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - 54y = 0$$

10. Form the differential equation of the family of curves $y = A\cos 3x + B\sin 3x$, where A, B are arbitrary constants.

PART—B

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 :

$$\int \sin^2\theta \cos^3\theta \, d\theta$$

(b) Evaluate :

$$\int \sin 5x \cos 2x \, dx$$

12. *(a)* Evaluate :

$$\int \frac{1}{\sqrt{x^2 + x + 1}} \, dx$$

(b) Evaluate :

$$\int x^3 e^{4x} dx$$

13. *(a)* Evaluate

$$\int_0^{\pi/2} \frac{\cos^{14} x}{\cos^{14} x + \sin^{14} x} \, dx$$

(b) Find the area enclosed between by the circle $x^2 + y^2 = a^2$ using the method of integration.

14. *(a)* Find the volume of the solid obtained when the region

$$\frac{x^2}{9} + \frac{y^2}{4} = 1$$

is revolved about x-axis.

(b) Find the RMS value of $\sqrt{\log x}$ between $x = 1$ and $x = e$.

15. *(a)* Solve :

$$\frac{dy}{dx} + y = e^{-x}$$

(b) Solve :

$$(D^2 + 5D + 6)y = e^x$$

16. Solve :

$$\frac{dy}{dx} = \frac{y}{x} + \cot\frac{y}{x}$$

17. *(a)* Solve :

$$(D^2 - 1)y = \sin 3x$$

(b) Solve :

$$(D^2 + 1)y = x$$

18. Evaluate

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

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

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