C09-C-302

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BOARD DIPLOMA EXAMINATION, (C-09)
OCT/NOV—2013
DCE—THIRD SEMESTER 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 :

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

2. Evaluate :

$$\int \sqrt{1-\cos 2x}\, dx$$

3. Evaluate :

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

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4. Evaluate :

$$\int \frac{dx}{\sqrt{3+x^2}}$$

5. Evaluate :

$$\int \left(x^5 - \frac{4}{x} + 3\cos x \right) dx$$

6. Evaluate :

$$\int_0^1 (x^4 + 1)\, dx$$

7. Write the formula to find the RMS value of $y = f(x)$ between $x = a$ and $x = b$.

8. Solve :

$$x^5 dy + y^5 dx = 0$$

9. Find the particular integral of $(D^2 + 4)y = \sin 2x$.

10. Form the differential equation of the family of curves $y = Ae^{2x} + Be^{-2x}$, where A, B are arbitrary constants.

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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 :

$$\int \frac{1}{x^2 + 6x + 13} dx$$

(b) Evaluate :

$$\int x^3 e^x dx$$

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 x-axis.

(b) Find the RMS value of $\sqrt{\log x}$ over the range $x = 1$ to $x = e$.

14. *(a)* Evaluate :

$$\int_0^{\pi/2} \frac{\sin^{12} x}{\sin^{12} x + \cos^{12} x} dx$$

(b) Using the method of integration, find the area bounded by the circle $x^2 + y^2 = a^2$.

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15. *(a)* Solve :

$$(D^2 + 1)\,y = \cos x$$

(b) Solve :

$$(D^2 + 3D + 2)\,y = x^2$$

16. *(a)* Solve :

$$\frac{dy}{dx} - \frac{2y}{x} = 3x$$

(b) Solve :

$$(4D^2 + 4D - 3)\,y = e^{2x}$$

17. Solve :

$$x^2 y\,dx = (x^3 + y^3)\,dy$$

18. *(a)* Use Simpson's rule to find the value of

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

by taking five ordinates.

(b) Solve :

$$e^y dx + (xe^y + 2y)dy = 0$$

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