C20-C-CM-301

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BOARD DIPLOMA EXAMINATION, (C-20)

DECEMBER—2022

DCE – THIRD SEMESTER 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 $\int \left(x^5 + 5^x + \frac{5}{x} \right) dx$

2. Evaluate $\int e^{2x+3}\, dx$

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

4. Evaluate $\int \frac{1}{x^2+25}\, dx$

5. Evaluate $\int_0^{\pi} \sin x\, dx$

6. Find the mean value of $y = x^2 - 3x + 8$ between the limits $x = 1$ and $x = 2$.

7. Find the area bounded by the parabola $3y = x^2$, x-axis between the lines $x = 1$ and $x = 2$.

8. Find the order and degree of the differential equation

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

9. Solve $\frac{dy}{dx}=\sqrt{\frac{1-y^2}{1-x^2}}$

10. Find the integrating factor of $\frac{dy}{dx}+\frac{y}{x}=\frac{1}{x^4}$.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

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

11. *(a)* Evaluate $\int \sin^5\theta\cos^3\theta\, d\theta$

(OR)

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

12. *(a)* Evaluate $\int x\tan^{-1}x\,dx$

(OR)

(b) Evaluate $\int x^3e^{2x}\,dx$

13. *(a)* Evaluate $\int_0^1\frac{x^3}{1+x^8}\,dx$

(OR)

(b) Show that $\int_0^{\pi/2}\frac{\sin x}{\sin x+\cos x}\,dx=\frac{\pi}{4}$

14. *(a)* Find the area of the region bounded by the curves $y^2 = 8x$ and $x^2 = 8y$.

(OR)

(b) Find the RMS value of $\sqrt{8 - 4x^2}$ between $x = 0$ and $x = 3$.

15. *(a)* Find the volume of the solid generated by revolution of the ellipse $\frac{x^2}{16} + \frac{y^2}{4} = 1$ about x-axis.

(OR)

(b) Calculate the approximate value of $\int_1^{11} x^3\,dx$ by Simpson's $\frac{1}{3}$rd rule using ten equal intervals.

PART—C 10×1=10

Instructions : (1) Answer the following question.

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

16. Solve $(9x + 5y - 9)\,dx + (5x + 7y - 4)\,dy = 0$

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