7201

C20-COMMON–301

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BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

COMMON – 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 $\int \left(x^3 + 3x + 2\right) dx.$

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

3. Find $\int \frac{1}{x \log x} dx.$

4. Evaluate $\int \sqrt{1 + \cos 2\theta}\ d\theta.$

5. Evaluate $\int_0^1 \left(x^5 + 1\right) dx.$

6. Find the mean value of $2x + 1$ in the interval [2, 6].

7. Find the area of the region bounded by the curve $y = \cos x$ between $x = 0$ and $x = \frac{\pi}{2}$.

8. Find the order and degree of the differential equation $\left(x^2+1\right)\frac{dy}{dx}+2xy=4x^2$.

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

10. Solve $\frac{dy}{dx}+\frac{y}{x}=0$.

PART—B

8×5=40

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

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

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

(OR)

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

12. (a) Evaluate $\int\cos^3\theta\sin^6\theta\,d\theta$.

(OR)

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

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

(OR)

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

14. (a) Find the enclosed area between the curve $y = x^2$ and the straight line $y = 3x + 4$.

(OR)

(b) Find the RMS value of $\sqrt{x}$ over the range $x = 1$ and $x = 3$.

15. *(a)* Find the volume generated by the revolution of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ about x-axis.

(OR)

(b) Evaluate $\int_0^1 x^2 dx$ approximately by dividing the interval (0, 1) into 10 equal sub-interval using Simpson's rule.

PART—C

10×1=10

Instructions : (1) Answer the following question.
(2) The question carries **ten** marks.

16. Solve $\left(6x^2 + 4xy + 5y^2\right)dx + \left(10xy + 2x^2 + 3y^2\right)dy = 0$.

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