7201

C20-COMMON–301

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BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 2022

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 $\int (\sec^2 x - e^x + \sin x)\,dx$

2. Evaluate $\int \sin^2 x dx$

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

4. Evaluate $\int x e^x dx$

5. Evaluate $\int_1^{\sqrt{3}} \frac{1}{1+x^2} dx$

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

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

8. Find the differential equation corresponding to $y = A + Be^r$, where A and B are arbitrary constants.

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

10. Solve $\frac{dy}{dx} + \frac{y}{x} = 1$

PART—B

8×5=40

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

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

11. Evaluate $\int \frac{1}{x^2 + 6x + 25} dx$

(OR)

Evaluate $\int \sin^5 x \cos^4 x \, dx$

12. Evaluate $\int x \tan^{-1} x \, dx$

(OR)

Evaluate $\int x^3 \sin 2x \, dx$

13. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$

(OR)

Show that $\int_0^{\frac{\pi}{4}} \log(1 + \tan\theta) d\theta = \frac{\pi}{8} \log 2$

14. Find the R.M.S value of $\sqrt{\log x}$ over the range $x = 1$ to $x = e$.

(OR)

Find the area enclosed by the curve $4x^2 + 9y^2 = 36$.

15. Find the approximate value of $\int_0^1 \frac{1}{x} dx$ using Trapezoidal rule by dividing [0,1] into five equal parts.

(OR)

Find the Volume of the solid generated revolving the circle $x^2 + y^2 = 25$.

PART—C 10×1=10

Instructions : (1) Answer the following question.

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

16. Solve $y^2 dx + (xy + x^2) dy = 0$

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