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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 $\int (3x^2 + 2x + 5)\,dx$

2. Evaluate $\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx$

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

4. Evaluate $\int \frac{e^{\sin^{-1}x}}{\sqrt{1-x^2}}\,dx$

5. Evaluate $\int_0^1 (x^3 + 1)\,dx$

6. Find the mean value of $f(x) = x^2 + 3$ over the interval $[0,1]$.

7. Find the volume of the solid of revolution generated by revolving the area between the curve $y = \sqrt{x}$ about x-axis between x = 2 and x = 4.

8. Find the differential equation for $y = a\sin 3x$.

9. Solve $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$

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

PART—B

8×5=40

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

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

11. *(a)* Find $\int \frac{1}{\sqrt{x^2+2x+3}}\,dx$

(OR)

(b) Evaluate $\frac{1}{5+4\sin x}$

12. *(a)* Evaluate $\int \frac{1}{(x+1)(x+2)}\,dx$

(OR)

(b) Find $\int x \tan^1 x\,dx$

13. *(a)* Evaluate $\int_0^1 \frac{\cos^{-1} x}{\sqrt{1-x^2}}\,dx$

(OR)

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin^{20} x}{\sin^{20} x + \cos^{20} x}\,dx$

14. *(a)* Find the area of the region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by the method of integration.

(OR)

(b) Find the R.M.S value of $\sqrt{16-3x^2}$ between x = 0 and x = 2.

15. *(a)* Find the volume of a right circular cone of height '*h*' and base radius '*r*' using integration.

(OR)

(b) Obtain the value of $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal rule by taking $n = 6$.

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

16. Solve $\frac{dy}{dx} = \frac{y}{x} + \cos^2\left(\frac{y}{x}\right)$

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