6201

C16-A-AA-AEI-CH-CHST-MET-MNG-TT-BM-C-CM-IT-EC-CHPC-PCT-EE-CHPP-PET-M-CHOT-RAC–**301**

6201

BOARD DIPLOMA EXAMINATION, (C-16)

AUGUST/SEPTEMBER—2021

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 : $\int \left(e^x + \sin x + x\right) dx$

2. Evaluate : $\int \frac{1}{1+x^2} dx$

3. Evaluate : $\int_0^1 \left(x^2 + 1\right) dx$

4. Find the area bounded by the parabola $y = x^2$ from $x = 0$ to $x = 1$.

5. Find $L\left(1 + \cos t - e^{2t}\right)$

6. Find $\int_0^{\pi/4} \sec^2 x \, dx$

7. Find the Fourier coefficient a_0 for $f(x) = x^2$ in $0 < x < 2\pi$.

8. Find the differential equation to the family of curves $y = a\cos x$, where a is arbitrary constant.

9. Solve : $\frac{dy}{dx} = \frac{x}{y}$

10. Solve : $\left(D^2 - 6D + 8\right)y = 0$

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

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

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

(b) Evaluate : $\int \sin^3 x \cos x \, dx$

12. *(a)* Evaluate : $\int \frac{\sin^{-1} x}{\sqrt{1-x^2}}dx$

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

13. *(a)* Evaluate : $\int_1^3 \left(3x^2 + 5x + 2 + \frac{1}{x}\right)dx$

(b) Find the volume of the solid formed by $y^2 = 4x$ revolving about x-axis from $x = 0$ to $x = 1$.

14. Evaluate $\int_{1}^{11} x^2 dx$ using Simpson's rule by taking $n = 10$.

15. *(a)* Find the RMS value of $\sqrt{8-4x^2}$ between the lines $x = 0$ and $x = 1$.

(b) Find $L\{t(e^{2t}+1)\}$

16. Find the Fourier series for the function $f(x) = x$ in the interval $[-\pi, \pi]$.

17. *(a)* Solve : $\frac{dy}{dx} + \frac{y}{x} = x^2$

(b) Solve : $(x^2+1)dx + (1+y^2)dy = 0$

18. Solve : $(D^2 + 5D + 6)y = e^x + e^{-x}$

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