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

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

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

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

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

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

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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 :  $(D^2 - 6D + 8)y = 0$

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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