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**C-16-A/AA/AEI/BM/CH/  
CHST/MET/MNG/TT-301**

**6201**

**BOARD DIPLOMA EXAMINATION**

**DMET-THIRD SEMESTER**

**OCT/NOV - 2019**

**ENGINEERING MATHEMATICS - II**

Time: 3 hours

Max. Marks: 80

**PART – A**

**3 X 10 = 30**

- Instructions:**
1. Answer **all** questions.
  2. Each question carries **Three Marks**.
  3. Answer should be brief and straight to the point and should not exceed Five simple sentences.

1. Evaluate  $\int (x^7 + 7x + \frac{7}{x}) dx$

2. Evaluate  $\int \sec^2 (2x + 3) dx$

3. Evaluate  $\int_0^{\sqrt{3}} \frac{1}{1+x^2}$

4. Find the mean value of  $f(x) = \sin^2 x$  on the interval  $[0, 2\pi]$

5. Find  $L\{5t^3 + 3e^{-3t} - 3\}$

6. Find  $L^{-1}\{\frac{1}{s^2-9}\}$

7. Find the value of  $a_0$  in the Fourier Series expansion of  $f(x) = x$  in  $0 < x < 2\pi$

8. find the order and degree of the Differential Equation  $\frac{dy}{dx} + y = \frac{1}{(\frac{dy}{dx})}$

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

10. Solve  $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 0$

**PART – B**

**5 X 10 = 50**

- Instructions:**
1. Answer any **Five** questions
  2. Each question carries **TEN** Marks.
  3. Answer should be comprehensive and a criterion for valuation is the content but not the length of the answer.

11. a) Evaluate  $\int \sin^4\theta \cos^3\theta \, d\theta$

b) Evaluate  $\int \left( \frac{1}{1 + \sin x + \cos x} \right) dx$

12. a) Evaluate  $\int \sin^{-1}x \, dx$

b) Evaluate  $\int_0^4 \frac{x}{x^2+1}$

13. a) Find the area bounded by the Parabola  $x^2 = 8y$  and its latus rectum  $y - 2 = 0$

b) Find the volume of the solid of revolution about x-axis, generated by revolving the area enclosed between the curve  $y = x^2 - 4$  and x-axis.

14. a) Evaluate  $\int_0^1 x^3 \, dx$  using Simpson's rule by taking  $n = 4$ .

b) Find  $L\{t^2 \sin t\}$

15. a) Find  $L^{-1}\left\{\frac{s}{(s+3)^2}\right\}$

**[Cont.,**

\* b) using Convolution theorem Find  $L^{-1}\left\{\frac{1}{s(s^2-9)}\right\}$

16. Find the Fourier series for  $f(x) = |x|$  in  $-\pi < x < \pi$  and hence deduce that

$$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots \infty = \frac{\pi^2}{8}$$

17. a) Solve  $\frac{dy}{dx} + 1 = e^{x+y}$

b) Solve  $\frac{dy}{dx} - \frac{2y}{x} = 3x$

18. Solve the following differential equations

a)  $(D^4 - 4D^2 + 4)y = 0$

b)  $(D^2 - D - 2)y = e^x + \cos x$

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