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

6201

BOARD DIPLOMA EXAMINATIONS

DMET-THIRD SEMESTER

SEPTEMBER/OCTOBER - 2020

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 $\int (\sec^2 - e^x + \sin x) dx$
2. Evaluate $\int (2x - 3)^8 dx$
3. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$
4. Find the mean value of $f(x) = x^2 + 3$ on the interval $[0,4]$
5. Find the Laplace Transform of the function $7e^{2t} - 5t^4 + 6$
6. Find $L^{-1}\left\{\frac{s}{s^2+9}\right\}$
7. Find the value of a_0 in the Fourier Series expansion of $f(x) = |x|$ in $-\pi < x < \pi$
8. find the order and degree of the Differential Equation $\frac{d^2y}{dx^2} = \left\{ y + \left(\frac{dy}{dx}\right)^6 \right\}^{\frac{1}{4}}$

[Cont...,

9. Solve $x^5 dy + y^5 dx = 0$

10. Solve $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$

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 $\int \sin^3 x \cos^6 x dx$

b) Evaluate $\int \left(\frac{1}{4 + 5 \cos x} \right) dx$

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

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

13. a) Find the area bounded by the Parabola $y = x^2$, x-axis and the ordinate $x = 3$

b) Find the volume generated by revolving the area bounded by curve $y = x^3$ about y-axis, between the lines $y = 0$ and $y = 8$.

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

b) Find $L\{t \cos 3t\}$

15. a) Find $L^{-1}\left\{\frac{s}{(s-4)^3}\right\}$

b) using Convolution theorem Find $L^{-1}\left\{\frac{1}{s(s^2-4)}\right\}$

[Cont.,

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16. Find the Fourier series for $f(x) = x^2$ in $-\pi < x < \pi$ and hence deduce that

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots \infty = \frac{\pi^2}{6}$$

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

b) Solve $\frac{dy}{dx} + \frac{y}{x} = 1$

18. Solve the following differential equations

a) $(D^3 + D^2 + 4D + 4)y = 0$, Where $D = \frac{d}{dx}$

b) $(D^2 + 3D + 2)y = x$, Where $D = \frac{d}{dx}$

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