6237

BOARD DIPLOMA EXAMINATIONS

DEE-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 $\int \tan^{-1}\left(\sqrt{\frac{1-\cos 2x}{1+\cos 2x}}\right)\ dx$

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

3. Evaluate $\int_1^2 \frac{1}{x\sqrt{x^2-1}}\ dx$

4. Find the mean value of $f(t) = \cos^2 t$ over the interval $[0,\pi]$

5. Find $L\{2e^{-7t} + 5t^3 + \sinh 2t\}$

6. Find $L^{-1}\left\{ \frac{2s+5}{4s^2+25} \right\}$

7. Find the value of a_0 in the Fourier series expansion of the function

   $f(x) = |\cos\ x|$ in the interval $[-\pi,\ \pi]$

                                                                        [Cont..,

8. Find the differential equation of the family of circles with their centers at the origin.

9. Find the Integrating Factor of the differential equation $\frac{dy}{dx} + y = 2 \cos x$

10. Find the Particular Integral of $\frac{d^2y}{dx^2} + y = 17$

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 $\int \frac{1}{\sqrt{1+x-x^2}} \, dx$

   b) Evaluate $\int \left(\frac{x}{(x-1)(2x-1)} \right) \, dx$

12.
   a) Evaluate $\int e^x \left(\frac{x}{(x+1)^2} \right) \, dx$

   b) Evaluate $\int_0^1 x^2 e^{-2x} \, dx$

13.
   (a) Find the RMS value of $y = \sqrt{16 - 2x^2}$ over [0, 1]

   (b) Find the volume of the solid formed by revolving the area enclosed by the curve $y = x^3$, the y-axis and the lines $y = 0$, $y = 27$ about y-axis

[Cont..,

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14.

a) Evaluate $\int_1^2 \frac{1}{x}\, dx$ by dividing the interval [1, 2] into 10 equal parts using

Simpson's rule.

b) Find L $\{\int_0^t e^{-t} \cosh t\, dt\}$

15. a) Find $L^{-1}\{\frac{s-7}{s\,(s+4)}\}$

b) using Convolution theorem Find $L^{-1}\{\frac{s}{(s^2+1)\,(25+s^2)}\}$

16. Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval (0, 2)

17. (a)Solve $(2x + y + 1)\, dx + (2y + x + 8)\, dy = 0$

b) solve $\frac{dy}{dx} - 2y\, \tan x = y^2 \tan^2 x\, dx$

18. Solve $(D^2 - 6D + 9)y = \sin x$ given that $y = \frac{dy}{dx} = 0$ at $x = 0$ and

where $D = \frac{d}{dx}$