6222

BOARD DIPLOMA EXAMINATIONS

COMMON-THIRD SEMISTER

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 $\int (\frac{1}{2\sqrt{x}} + 7sec^2\text{x} + \frac{1}{x}) \, dx$

2. Evaluate $\int e^{5x-7} \, dx$

3. Evaluate $\int_0^1 \frac{1}{\sqrt{1-x^2}} \, dx$

4. Find the mean value of $f(x) = log \, x$ over the interval $[1,e]$

5. Find $L\{ \, 3\cos 2t \, - \, 4 \, sin \, 3t \, \}$

6. Find $L^{-1} \{ \frac{1}{s \, (s+2)} \}$

                                                                          [Cont..,

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

$f(x) = e^{-x}$ in the interval $[0, 2\pi]$

8. Find the order and degree of the Differential Equation

$$\frac{d^3y}{dx^3} = \log_e \left(x \frac{d^2y}{dx^2} + y \right)$$

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

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

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 $\int \sin^5\theta \, \cos^3\theta \, dx$

   b) Evaluate $\int \left(\frac{1}{3+4\cos x} \right) \, dx$

12.
   a) Evaluate $\int x \, \sin x \, dx$

   b) Evaluate $\int_0^{\pi/2} \log \tan x \, dx$

[Cont..,

13. (a)Find the area bounded by the curve $y^2 = 16x$, *y-axis and the line*

$y = 2$ *and* $y=6$

(b)Using the method of integration find the volume of Cylinder with radius r units and height h units.

14. a) Calculate the approximate value of $\int_{-3}^{3} x^4 \, dx$ using Simpson's rule by dividing [-3,3] into 6 equal parts. Verify the result with its exact value by integration techniques.

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

15. a) Find $L^{-1}\left\{\dfrac{s}{(s+2)^2 + 4}\right\}$

b) using Convolution theorem Find $L^{-1}\left\{\dfrac{1}{s(s^2 + 25)}\right\}$

16. Expand $f(x) = e^{-x}$, $-\pi < x < \pi$ in Fourier Series.

17. (a)Solve $\dfrac{dy}{dx} = \sin(x + y) + \cos(x + y)$

(b) solve $\dfrac{d}{dx} + \dfrac{y}{1 + x^2} = \dfrac{e^{\tan^{-1} x}}{1 + x^2}$

18. a) Solve $(D^2 + D - 6)y = e^{3x}$, where $D = \dfrac{dy}{dx}$

b) Solve $(D^3 + D)y = \sin 2x$