STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
TELANGANA
DIPLOMA EXAMINATION (C-18)
C18-JAN-2022
SEMESTER III , SEMESTER END EXAM
A/AA/BM/C/CH/CM/EC/EE/EI/ES/EV/FW/M/MET/MNG/PKG/PT/TT
301F
APPLIED ENGINEERING MATHEMATICS

PCODE
6301

Duration: 2 Hours   [Total Marks: 40]

PART-A

Instructions: 1. Answer the following questions.   8 X 1 = 8
2. Each question carries **ONE** mark.

1. Write the formula for $\int \frac{1}{a^2 - x^2} \, dx$

2. Evaluate $\int_0^{\frac{\pi}{2}} \cos x \, dx$

3. Find the mean value of e^t in $[-1.1]$

4. Evaluate $\int (sec^2 x - e^x + \sin x) \, dx$

5. Write the formula to find approximate value of $\int_a^b y \, dx$ by using Simpon's Rule by dividing the range [a,b] into 'n' equal parts

6. Define RMS value of a function

7. Solve $\frac{dy}{dx} = \frac{y}{x}$

8. Find the differential equation of family of curves $y = A\cos x + B\sin x$

PART-B

Instructions: 1. Answer the following questions.   4 X 3 = 12
2. Each question carries **THREE** marks.

9(a). Evaluate $\int \log x \, dx$

9(b). Given that

x	1	2	3	4
y	0.7111	0.7222	0.7333	0.7444

Evaluate $\int_{1}^{4} y\,dx$ approximately by Trapezoidal Rule

10(a). Find the area of the region bounded by the line $2y+x = 8$, x-axis and the lines $x = 2$ and $x = 4$

----- OR ----

10(b). Sovle $(6x + y + 1)dx + (10y + x + 1)dy = 0$

11(a). Find the mean value of $y^2 = 4x$ from $x = 0$ to $x = 4$

----- OR ----

11(b). Find the mean square value of $y = \sqrt{x}$ over the range $x = 0$ and $x = 1$

12(a). Solve $\dfrac{dy}{dx} = e^{x-2y}$

----- OR ----

12(b). Solve: $\dfrac{dy}{dx} = \dfrac{y}{x} + \cos^2(\dfrac{y}{x})$

PART-C

Instructions: 1. Answer the following questions.   4 X 5 = 20
2. Each question carries **FIVE** marks.

13(a). Evaluate $\int \dfrac{1}{x(x + 1)(x + 2)}\,dx$

----- OR ----

13(b). Evaluate $\int_{0}^{1} x^3\,dx$ by using Trapezoidal Rule by taking n=5

14(a). Find the area bounded by the parabola $y^2 = 2x$ and the straight line $4x - y - 1 = 0$.

----- OR ----

14(b). Solve $\sec^2 x \ \tan y \ dx + \sec^2 y \ \tan x \ dy = 0$

15(a). Find the R M S value of $\sqrt{\log x}$ over the range $x = 1$ and $x = e$.

----- OR ----

15(b). Find the approximate value of by $\int_0^1 \dfrac{1}{1+x^2} dx$ Simpon's Rule by dividing the interval [0,1] into 4 equal parts and hence find the approximate value of π

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

----- OR ----

16(b). Solve $\dfrac{dy}{dx} + y \tan x = y^2 \sec x$