

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING  
TELANGANA  
DIPLOMA EXAMINATION (C-21)  
C21-NOV-2022  
SEMESTER III, SEMESTER END EXAM



AA/AU/BM/CB/CE/CH/CPS/CS/EC/EE/EL/ES/EV/LF/LG/ME/MN/MT/PK/PI/TT

**SC-301**

**PCODE  
13001**

**Applied Engineering Mathematics(Open Book System)**

Exam Date: 25-11-2022

Session: FN

Duration: 2 Hours [10:00 AM To 12:00  
NOON]

[Total Marks: 40]

**PART-A**

**Instructions:**

1. Answer the following questions.
2. Each question carries ONE mark.

8 X 1 = 8

1. Evaluate  $\int (x^3 + 4x^2) dx$

2. Find the value of the integral  $\int_0^1 e^{-x} dx$

3. Find the order and degree of  $y^4 + y = e^x$

4. Write the successive derivatives of 'u' while applying Bernoulli's rule to evaluate  $\int x^2 e^x dx$

5. Find the mean square value  $f(x) = \sqrt{x+1}$  in  $[0,3]$

6. Find the mean value of  $3e^x$  over  $[-1,1]$

7. Check the differential equation  $(2ax + by + g)dx + (2cy + bx + e)dy = 0$  is an exact or not?

8. Find the order and degree of  $\left(\frac{dy}{dx}\right)^4 + 2y \frac{d^2y}{dx^2} = 0$

**PART-B**

**Instructions:**

1. Answer the following questions.
2. Each question carries THREE marks.

4 X 3 = 12

9(a). Evaluate  $\int \sqrt{1 + \cos x} dx$

----- OR -----

9(b). If

x	0	0.25	0.5	0.75	1.0
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y	1	0.25	0.8	0.64	0.50
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then find the value of  $\int_0^1 y dx$  using trapezoidal rule.

10(a).

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

— OR —

10(b).

Find the differential equations of the family of curves  $y = Ae^{2x} + Be^{-2x}$  by eliminating the arbitrary constants A and B.

11(a).

Find the Mean value of  $y = x^2 - 3$  from  $x=2$  to  $x=3$

— OR —

11(b).

if

x	0	0.1	0.2	0.3	0.4
y	0	10	40	90	160

then find the value of  $\int_0^{0.4} y dx$  using Simpson's rule

12(a).

Solve  $\frac{dy}{dx} = e^{x-2y}$

— OR —

12(b).

Solve  $(x+y-2) dx + (x-y+4) dy = 0$

### PART-C

**Instructions:**

1. Answer the following questions.

4 X 5 = 20

2. Each question carries FIVE marks.

13(a).

Evaluate  $\int \frac{1}{(x^2+a^2)(x^2+b^2)} dx$  <https://www.sbtetonline.com>

— OR —

13(b).

Find the R.M.S value of the current  $i = 6 \sin x$ , over a half wave

14(a).

Evaluate  $\int_0^{\pi} |\sin x| dx$

— OR —

14(b).

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

15(a).

Evaluate  $\int_{-3}^3 x^4 dx$  using trapezoidal rule by taking  $n=6$

--- OR ---

15(b). Find the RMS Value of  $xe^x$  in the range between  $x = 0$  and  $x = 1$

16(a). Solve  $\frac{dy}{dx} + xy = xy^3$

--- OR ---

16(b). Solve  $(1+x^2)\frac{dy}{dx} + y = e^{\tan^{-1}(x)}$

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