The Open University of Sri Lanka
B.Sc. Degree Programme – Level 05
Department of Computer Science
CSU5305 – Theory of Computing
Continuous Assessment Test-01 (CAT-1) 2023/24
Duration: One hour only (1 hour)

Date: 05.01.2024 Time: 10.30 a.m. – 11.30 a.m.

Reg Number:

Important Instructions

- This paper has 2 questions on 03 pages.
- Answer all 2 questions.
- Write your answers only on the space provided on this question paper.
- **No extra sheets will be provided.**
- Questions appear on both sides of the paper.
- Last page (page 04) can be used as for rough work.

To be completed by the examiners:

1	
2	
Total	
%	

Reg Number: | |

(01) (i) What are the three main streams covered by CSU5305- Theory of Computing?

1.

2.

3.

(ii) Write the definition of an **Alphabet** in Theory of Computing.

(iii) Using your answer to (01) part (ii) define a **string** in Theory of Computing.

(iv) what is meant by a **Null String**?

(v) If S and T are two sets of strings, write strings **concatenation** in set notation.

(vi) Using your answer to (01) part (v) write the concatenation of the strings 01 with 100.

(vii) What is the main difference between **Kleene Closure** and **Positive Closure** of an alphabet?

(viii) {0,1} is a binary alphabet and 11 is a binary string over the alphabet {0,1}. What is the length of the string 11?

(ix) If Σ is an alphabet, then what is denoted by Σ^*

(x) Consider an alphabet Σ and suppose A on Σ is a subset of Σ^*. Write one word to name **A**

(50 marks)

Reg Number:

(02) (i) For a language to be a formal language what are the two conditions needed?

(ii) what is the relationship between a **Regular Expression** and a **Regular Language**?

(iii) Write the two base case regular expressions over Σ

1.

2.

(iv) Write the corresponding languages of the regular expressions given below.

$(a)\ (cd)^*$:

$(b)\ (c^*)(d^*)$:

(v) If L_1 and L_2 are languages given by $L_1 = \{\varepsilon, 1, 01, 11\}$ and $L_2 = \{1, 01, 101\}$ what are

$(a)\ L_1 - L_2 =$

$(b) L_2 - L_1 =$

(50 marks)