National University of Computer and Emerging Sciences Lahore Campus

Theory o	of Automata (CS3005)	Sessional-II Exa

Date: November 2nd 2024, [Saturday]

Course Instructor(s)

Ms. Sobia Tariq, Dr. Tahir Ejaz

Mr. Hamad ul Qudous, Mr. Fraz Yousaf

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Total Time (Hrs.):

25 **Total Marks:**

2 **Total Questions:**

Roll No	Section	Student Signature	ol.

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1. Attempt all the questions.

2. Rough sheets are allowed but you are required to write solution in the provided space.

CLO 3	
Question 2 (15)	Total Marks (25)

CLO #: 3 Differentiate and manipulate formal descriptions of languages, automata and grammars with focus on context-free languages using automata (PDA and NPDA).

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Q1: L	is a	context-free	Language

[10 Marks]

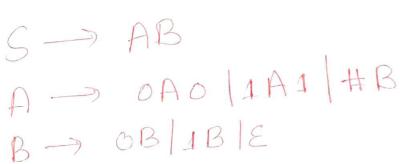
L= $\{x \mid x = W \# Y, \text{ where } W^R \text{ (reverse of W) is a substring of Y and W,Y } \epsilon \{0,1\}^* \}$

Part-A

Give Context Free Grammar for L

Note: Use a maximum of three variables/non-terminals otherwise, ZERO marks will be awarded.

Solution:





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Part-B

Develop PDA for L. Also tell whether it will be DPDA or NPDA

[15 Marks]

Solution:

