United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

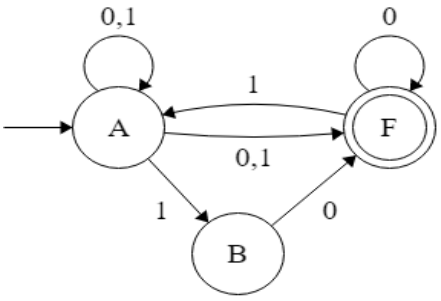
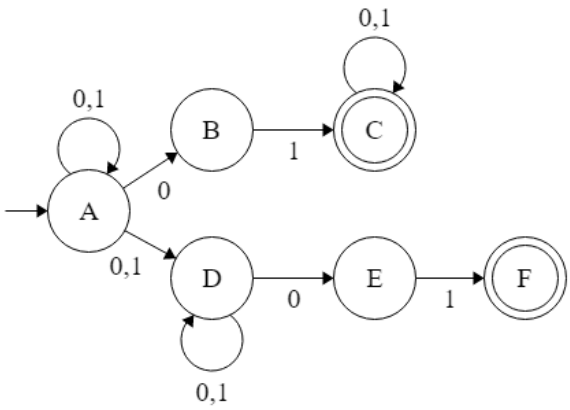
Mid Exam Fall 2021.

CSE 2233/CSI 233: Theory of Computation/Theory of Computing

Total Marks: **30** Duration: 105 Minutes

Answer all questions. Figures are in the right-hand margin indicates full marks.

Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.

1.	Design DFAs that accept the following languages: **a)** L= contains 'zyx' and ends with 'zy' | $\sum$ = {x,y,z} **b)** L= does not contain '0121' | $\sum$ = {0,1,2} **c)** L = starts with 'mn' and contains 'xm' and ends with 'x' | $\sum$ = {m,n,x}	3x3
2.	Design NFAs that accept the following languages: **a)** L= ends with 'b' and contains 'ca' and starts with 'a' | $\sum$ = {a,b,c} **b)** L= contains '110' or '011' or '122' and ends with '3' | $\sum$ = {0,1,2,3} **c)** L = starts with 'mxn' and contains 'mxn' and ends with 'mxn' | $\sum$ = {m,n,x}	3x3
3.	Consider the following NFA, and show with the help of NFA-tree whether the string "1101010" is accepted or not. 	3
4.	Convert the following NFA over alphabet $\sum = \{0,1\}$ to an equivalent DFA. 	6

5.	Develop Regular expression over $\sum = \{a, b\}$ for following languages: a) All strings w where every 'a' is followed by at least one 'b'. b) All strings w which contains 'bba'. c) All strings w where number of 'b's is a multiple of 3.	3x1