United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

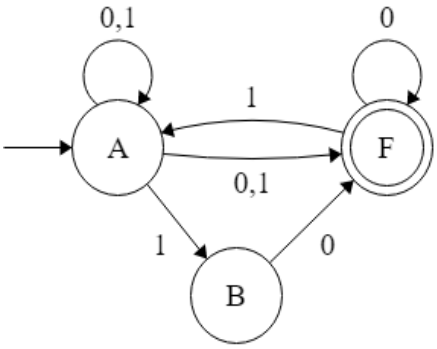
Mid Exam Summer 2022

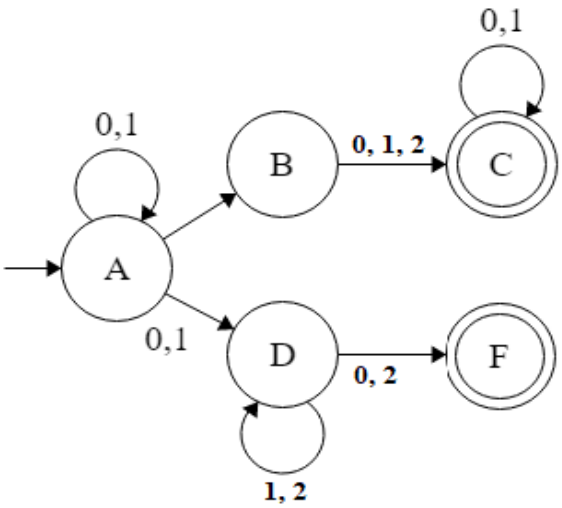
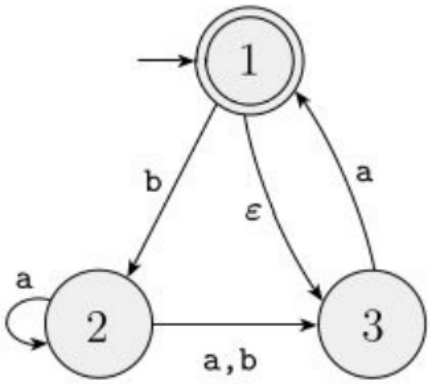
CSE 2233/CSI 233: Theory of Computation/Theory of Computing

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

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

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

1.	Design DFAs that accepts the following languages: **a)** L = {w | w starts and ends with different symbols and the length of w is even | Σ= {0, 1} **b)** L = {w | w contains at least two 'a's and at most one 'b'} | Σ = {a, b} **c)** L = {w | w contains even number of 0's or odd number of 2's.} over Σ = {0, 1, 2} **d)** L = {w| w contains all the binary number which is divisible by 3 or ends with "011" | Σ = {0, 1}	3 x 4
2.	Design NFAs that accepts the following languages: **a)** L= ends with 'b' and contains 'bbcb' and starts with 'aacd' | ∑ = {a,b,c,d} **b)** L= contains 'bba' or 'abb' or 'acc' and starts with 'ab' or 'bc' | ∑ = {a, b, c} **c)** L =starts with '121' *and* contains '212' or '312' *and* ends with '2' | ∑ = {1, 2, 3}	2.5 x 3
3.	Consider the following NFA, and show with the help of the NFA tree whether the string "11010" is accepted or not. 	3

4.	Convert the following NFA over alphabet $\sum = \{0, 1, 2\}$ to an equivalent DFA. 	4.5
5.	Convert the following ϵ-NFA over alphabet $\sum = \{a, b\}$ to an equivalent DFA. 	3