



United International University (UIU)
Dept. of Computer Science & Engineering (CSE)

Mid Exam Fall 2022

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

Total Marks: 30

Duration: 105 Minutes

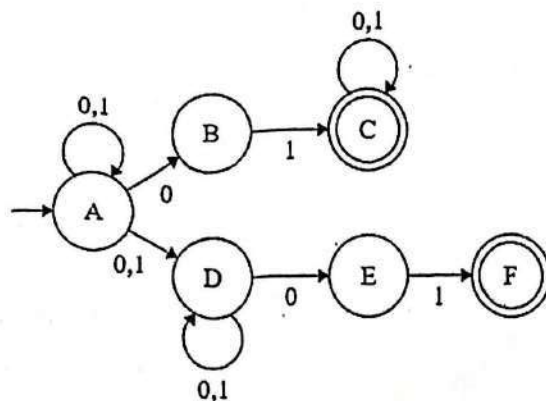
Answer all questions. Figures in the right-hand margin indicates full marks.

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

1	<p>Design DFAs that accepts the following languages:</p> <p>a) $L = \{w \mid w \text{ starts with 'ab' and contains 'bba' and ends with 'bb'}\}$ $\Sigma = \{a, b\}$</p> <p>b) $L = \{w \mid w \text{ contains the set of all strings that has length exactly 3 and its third symbol is from the left side is 'a'}\}$ $\Sigma = \{a, b\}$</p> <p>c) $L = \{w \mid w \text{ contains the set of all strings that has neither '00' nor '11' as substring}\}$ $\Sigma = \{0, 1, 2\}$</p> <p>d) $L = \{w \mid w \text{ contains the set of all strings whose length always returns remainder 2 when divided by 4.}\}$ $\Sigma = \{0, 1\}$</p>	2.5 x 4
2	<p>Design NFAs that accepts the following languages:</p> <p>a) $L = \text{ends with 'x' and contains 'yxz' and starts with 'xy'}$ $\Sigma = \{x, y, z\}$</p> <p>b) $L = \text{starts with 'pq' or 'qr' and contains 'pqp' or 'qrr' and ends with 'qqr'}$ $\Sigma = \{p, q, r\}$</p> <p>c) $L = \text{starts with '211' and contains '112' or '321' and ends with '1'}$ $\Sigma = \{1, 2, 3\}$</p>	3 x 3

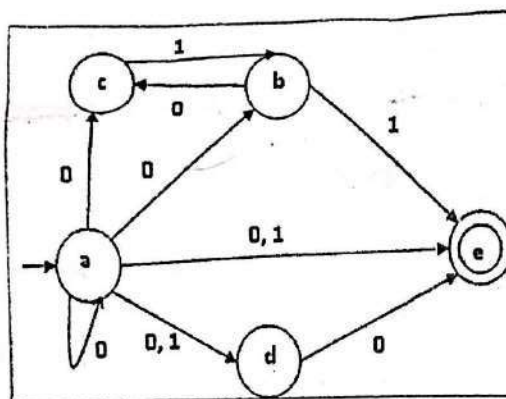
- 3 Consider the following NFA, and show with the help of NFA-tree whether the string "11010" is accepted or not.

3



- 4 Convert the following NFA over alphabet to an equivalent DFA.

4



- 5 Convert the following NFA over alphabet to an equivalent DFA.

4

