United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

[redacted]

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

Total Marks: **20** [redacted]

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.

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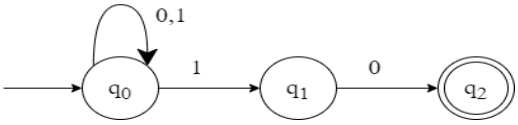
1 Design a DFA that accepts the language of strings that starts with **r** and ends with **pq** over the alphabet {p,q,r}. **3**

2 Design a DFA that accepts the language of strings that does end with **0** and does not contain the substring **101** over the alphabet {0,1}. **3**

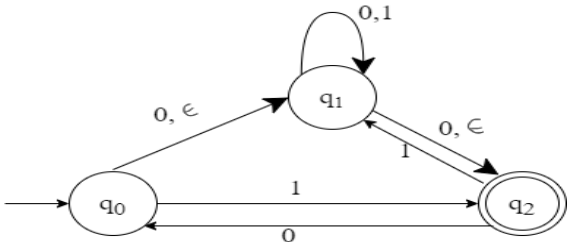
3 Draw the state diagram of an NFA for alphabet set {0,1,a} which starts and ends with **1a0**. **3**

4 Design an ϵ-NFA over the alphabet $\sum = \{a, b, c\}$ that accepts strings consisting of zero or more a's followed by zero or more b's, followed by zero or more c's. Use ϵ as much as you can to simplify your design. **3**

5 Consider the following NFA, and show with the help of NFA-tree whether the string "1101010" is accepted or not. **3**



6 Convert the following ∈-NFA over alphabet $\sum = \{a, b, c\}$ to an equivalent DFA. Show transition table. **3**



7 Write a Regular Expression for $\sum = \{a, b\}$ that starts and ends with different symbols. **2**