Southeast University
School of Science & Engineering
Department of Computer Science & Engineering
Summer 2020; Mid-Term Examination
Course Code: CSE3025; Course Title: Theory of Computing; Section: 12, 13
Full Time: 90 mins; Full Marks: 30

Part - A
(Answer any 1 (One) question)

1. (2 + 8)

a. Give the definition of a Deterministic Finite Automata (DFA).

b. Construct Regular Expression for each of the following Languages over Alphabet set {a, b}.

i. L1 = {w| all strings start and ended with different letter}

ii. L2 = {w| all strings with no occurrence of 'ba'}

iii. L3 = {w| all strings with length divisible by 4}

iv. L4 = {w| all strings hold 'ab' as substring exactly twice}

2. (2 + 8)

a. Give the definition of a Non-Deterministic Finite Automata (NFA).

b. Design a DFA for each of the following Languages over Alphabet set {a, b}.

i. L1 = {w| all strings start and ended with different letter}

ii. L2 = {w| all strings with length divisible by 4}

iii. L3 = {w| all strings with even length and even number of a}

iv. L4 = {w| all strings with odd a's and even b's}

Part - B
(Answer all questions)

3. (2 + 8)

a. Create an ϵ-NFA for the Regular Expression (a*(a+b))*

b. Find the equivalent minimized DFA for the DFA given in figure (1).

4. (2 + 8)

a. Give the definition of a Regular Expression (RE).

b. Convert the ϵ-NFA given in figure (2) to the equivalent DFA

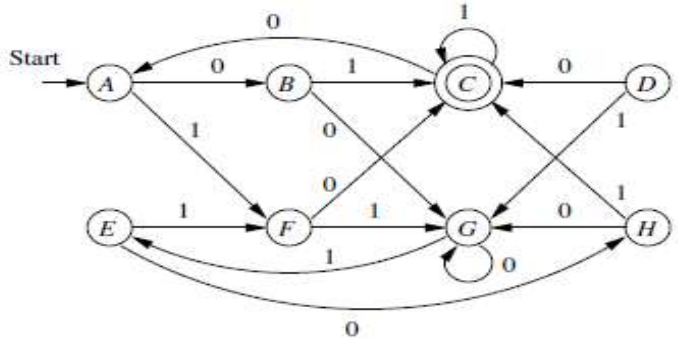

Figure (1)

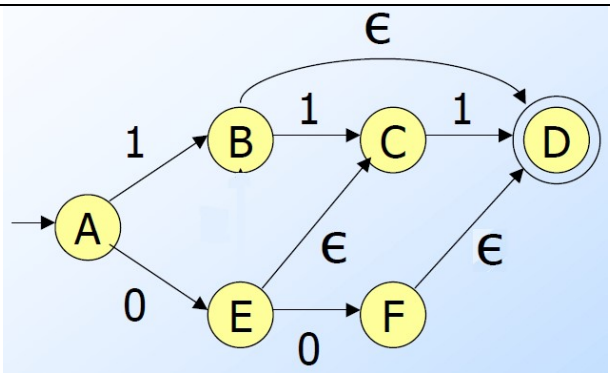

Figure (2)