University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Fall -2019

Program: B. Sc. Engineering (3rd Year/1st Semester)

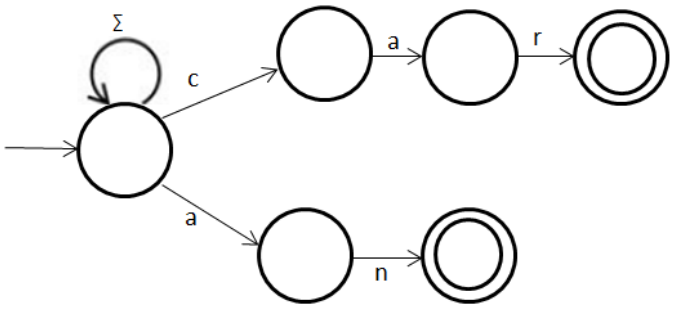
Course Title: Theory of Computation Course No. CSE 307 Credit: 3.00

Time: 1.00 Hours. Full Mark: 60

There are **Four** Questions. **Answer questions 3, 4 and (1 or 2).** All questions are of equal value/Figures in the right margin indicate marks.

1.a) Describe formal definition of Deterministic Finite Automata. 8

b) Convert the bellow diagram into DFA. 12



2.a) Describe symbol, alphabet and Language in perspective of finite automata. 8

b) Consider the following Є-NFA:

i) Find out the Є-closure for each state. 12

ii) Convert it into DFA. Show both transition table and diagram.

	Є	0	1	2
→A	{B,C}	Φ	{B}	{C}
B	Φ	{A}	{C}	{A,B}
C	Φ	Φ	Φ	Φ

3.a) Let $\sum$ = {a,b} 4+4

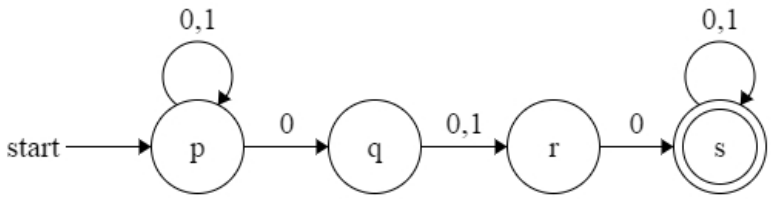
Suppose you are wanting to construct the following language:

"The set of all strings that either start with *ab* or *ba*."

i) Write the regular expression for this language.

ii) Draw the corresponding NFA.

b) Convert the following NFA into DFA. Show both transition table and diagram of the DFA. 12



4.a) Prove or disprove each of the following statement about regular expressions. 8

i) $(0 + 1)^*1(0 + 1)^* = (0 + 1)^*(10 + 11 + 1)(0 + 1)^*$

ii) $(RS + R)^*RS = (RR^*S)^*$

b) Show the Finite Automata for the following expression. 12

i) $Q(P+Q)^*$ ii) $AB^+(AB+B)$