CIT 342 – Formal Languages and Automata Theory **Credit: 3 units**

TIME ALLOWED: 2½ Hours
INSTRUCTION: Answer Question 1 and any other FOUR (4) Questions

QUESTIONS

1a(i) Determine the four elements of this set {0,1}* (2 marks)

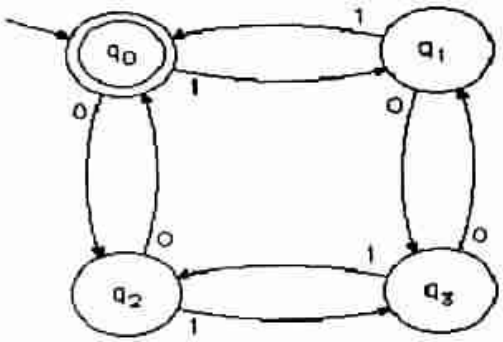
1a(ii). Explain the term "grammar" as it applies to formal language (3 marks)

1a(iii) Use the production rules below to prove if by parsing the string aaababbb makes the grammar ambiguous (2 marks)

$$S \rightarrow aSb$$
$$S \rightarrow ba$$

1b. Explain the differences among the classes of grammar defined by Noam Chomsky (8 marks)

1c. Determine if the string 10010011 is recognizable by using the mapping function transition (2 marks)



1d. Cite five classes of automata and the type of language they recognize (5 marks)

2a. What is parsing? 2 marks

2b. How is Backus-Naur Form used to describe a formal language? 1mark

2c. State the rules that guide the definition of a formal language over alphabet Σ= {0,1,2,3,4,5,6,7,8,9,+,=} (3marks)