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NATIONAL OPEN UNVERSITY OF NIGERIA

University Village, Plot 91, Cadastral Zone,

Nnamdi Azikiwe Expressway, Jabi, Abuja

FACULTY OF SCIENCES

November, 2018

***Course Code:*** **CIT342**

***Course Title:* Formal Languages and Automata Theory**

**Credit Units: 3**

***Time Allowed:* 2½ Hours**

***Instruction:* Answer Question 1 and any other four (4) questions**

**Question 1**

a) With the aid of a diagram, briefly describe the automata theory (8 marks)

b) Clearly **s**tate the Godel incompleteness theorem (5 marks)

c) Briefly explain the following terms: (9 marks)

**Question 2**

a)List the three ways of defining a language (3marks)

b) Define the following terms (9 marks)

1. Finite states ii. Infinite states iii. Stack memory

**Question 3**

a) In a formal way, describe an automaton (6 marks)

b)Explain the Regular Expressions (3 marks)

c)Define context-sensitive grammars (3 marks)

**Question 4**

a)List 6 types of Automata (6 marks)

b)As touching regular expressions, state the precedence of the following operations relative to one another (3 marks)

**c)** When is a grammar recursively enumerable? (3 marks)

**Question 5**

a)List and define the two types of Push Down Automata (4 marks)

b)A formal system can be regarded (i) complete; or (ii) incomplete. Discuss (5 marks)

c) Considering that an automaton as a computer, state the way(s) it can handle non-determinism (3 marks)

**Question 6**

a)Distinguish between regular grammar and context-free grammar (4 marks)

b)State **two** of the ways of implementing a DFA. (4 marks)

c) Explain the two types of Push Down Automata (4 marks)