NATIONAL OPEN UNIVERSITY OF NIGERIA
University Village, 91 Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja
FACULTY OF SCIENCES
COMPUTER SCIENCE DEPARTMENT
2020_1 EXAMINATIONS

CIT309 – Computer Architecture   **Credit:** 3 units
TIME ALLOWED: 2½ Hours
INSTRUCTION: Answer Question 1 and any other FOUR (4) Questions

1a) Describe the key concepts upon which the von Neumann architecture is based. **(6 marks)**
b) What is the difference between computer architecture and computer organization? **(4 marks)**
c) A pipeline is designed with 5 stages having execution times respectively as 3ns,5ns,4ns and 5ns. How much time will it take to execute 2000 instructions? **(2 marks)**
d) Name two RISC and two CISC processors. Explain five main characteristics of RISC processors. **(6 marks)**
e) What is virtual memory? Explain the need for virtual memory. **(2 marks)**
f) What is the difference between static and dynamic pipelines? **(2 marks)**

QUESTION TWO
a) Describe how the instruction cycle code (ICC) designates the state of the processor in terms of which portion of the cycle it is in. **(4 marks)**
b) Draw the flowchart that defines the complete sequence of microoperations, depending only on the instruction sequence and the interrupt pattern. **(8 marks)**

QUESTION THREE
a) Define the basic elements of a processor. **(4 marks)**
b) Describe the micro-operations that the processor performs. **(4 marks)**
c) Determine the functions that the control unit must perform to cause the microoperations to be performed. **(4 marks)**

QUESTION FOUR
a) Draw a general model of the control unit showing all the inputs and outputs. **(5 marks)**
b) Describe the inputs and outputs of the unit. **(7 marks)**

QUESTION FIVE
a) Briefly define types of parallel processing systems. **(7 marks)**
b) Draw the model of the Symmetric Multiprocessor system. **(5 marks)**

QUESTION SIX
a) Using Boolean algebra techniques, simplify the expression:
          AB + A(B+C) + B(B+C)   **(5 marks)**
b) Determine the binary values of the variables for which the following product-of-sums (POS) is equal to 0: $(A + B + C + D) (A + \bar{B} + \bar{C} + D) (\bar{A} + \bar{B} + \bar{C} + \bar{D})$ **(6 marks)**
c) What is parity bit. **(1 mark)**