



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

CIT344 – Introduction to Computer Design

Credit Units: 3

Instruction: *Answer Question (1) (22 marks) and any other four questions each carrying 12 marks*

Time: 2½ hours

- 1a) Write short notes on Combinational logic circuit enumerating how it is analysed and designed. **(Total = 10 marks)**
- (b) Give a full-adder function table and its corresponding implementation. **(6 marks)**
- (c) State the two basic operations performed on memories and the signals typically used to support them. **(6 marks)**
- 2a) Differentiate between a multiplexer and a demultiplexer. **(6 marks)**
- (b) Provide suitable diagrams in support of your answer in (a) above. **(Total = 3 marks)**
- (c) Why do we need to expand memory? **(3 marks)**
- 3a) Discuss the typical applications of encoders and decoders. **(7 marks)**
- (b) Using diagram only, show how interrupts are resolved with 2-to-4 priority encoders. **(5 marks)**
- 4a) Compare and contrast sequential and combinational logic circuits. **(6 marks)**
- (b) Convert the binary number 1101001 to (i) Octal and (ii) Hexadecimal **(3 marks)**
- (c) Convert the binary number 101011001 to (i) Octal and (ii) Hexadecimal **(3 marks)**
- 5a) Give the block diagram of a sequential circuit.
- (b) Draw the diagrams of a NAND-based S-R latch and a NOR-based S-R latch. **(3 marks)**
- (c) Compare the operations of your diagrams in (b) above. **(6 marks)**
- 6a) Discuss, very briefly but succinctly, the operating characteristics of a flip-flop. **(10 marks)**
- (b) What are the two major categories of memory chips? **(2 marks)**

- 7a) State the two major functions of a register and its different shift operations. (*7 marks*)
- (b) State the defining characteristics of finite state machines. (*5 marks*)