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)***