NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKWE EXPRESSWAY, JABI, ABUJA
FACULTY OF SCIENCES
DEPARTMET OF COMPUTER SCIENCE
OCTOBER, 2019 EXAMINATIONS

COURSE CODE: CIT344
COURSE TITLE: INTRODUCTION TO COMPUTER DESIGN
CREDIT: 3 UNITS
TIME ALLOWED: 2½ HOURS
INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER FOUR (4) QUESTIONS

1a) Write short notes on the following:
   i) BCD   *(4 marks)*
   ii) Gray codes   *(3 marks)*
b) State four reasons for memory expansion   *(4 marks)*
c) State the various characteristics Finite State Machines (FSMs) share   *(4 marks)*
d) List the flip-flop characteristics *(2½ marks)*
e) A processor has a 32 bits wide address bus.
   (i) What is the total memory location that the processor can access? *(2 marks)*
   (ii) What is the total memory size if all the memory locations are available to the processor?
   (2½ marks)

2a) Write short notes on Combinational logic circuit. *(3 marks)*
b) Identify the ways a Combinational logic circuit can be analysed. *(3 marks)*
c) How is a Combinational logic circuit designed? *(4 marks)*
d) What is a procedure in assembly language programming? *(2 marks)*

3a) Construct a full-adder function table and its corresponding implementation.   *(6 marks)*
 (b) Describe the various ways that pipelining improves performance?   *(6 marks)*

4a) State the two basic operations performed on memories *(2 marks)*
b) Enumerate the signals typically used to support the basic operations performed on memories.
          (6 marks)
c) Suppose SRAM cost ₦250 per MB for an access time of 5ns, DRAM cost N100 per MB with
an access time of 60ns, and the disk space costs ₦100 per GB with an access time of 7ms.
Assuming we have a memory system with 256Kb of cache SRAM, 128MB of main memory
DRAM, and 1GB of virtual memory (implemented as disk), calculate total cost of the memory
system   *(4 marks)*

5a) Differentiate between a multiplexer and a demultiplexer.   *(6 marks)*

b) Provide suitable diagrams in support of your answer in **(a)** above.   *(3 marks)*

c) What are register files? *(3 marks)*

6a) 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)*