

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**University Village, 91 Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja**

**FACULTY OF SCIENCES**

**NOVEMBER, 2018 EXAMINATIONS**

**COURSE CODE: CIT344**

**COURSE TITLE: Introduction to Computer Design**

**CREDIT: 3 Units**

**TIME ALLOWED: 2½ Hours**

**INSTRUCTION: Answer Question ONE (1) and any other FOUR (4) Questions**

1a) State the major ways by which finite state machines may be classified. ***(1 mark)***

b) Draw the block diagram of a Read-Write memory. ***(4 marks)***

c) Complete the cells in the table below with either "YES" or "NO". ***(6 marks)***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  **Characteristics** **Memory Type** | **Non-Volatile** | **High Density** | **One-Transistor** | **In-System Write Ability** |
| SRAM |  |  |  |  |
| DRAM |  |  |  |  |
| ROM |  |  |  |  |
| EPROM |  |  |  |  |
| EEPROM |  |  |  |  |
| FLASH |  |  |  |  |

d) State the application areas or uses of multiplexer. ***(2 marks)***

e) What are the major uses of decoders in computer systems? ***(2 marks)***

f) Write short notes on latch. ***(5 marks)***

g) Complete the cells in the Truth-Table below for a NAND-based S-R Latch. ***(2 marks)***

|  |  |
| --- | --- |
| **Input** | **Output** |
| S | R | Qt+1 |
| 0 | 0 |  |
| 0 | 1 |  |
| 1 | 0 |  |
| 1 | 1 |  |

2a) Write short notes on **Flip-Flops *(5 marks)***

b) Briefly describe a **Half-Adder.** Use diagram to illustrate your answer. ***(3 marks)***

c) How many types of sequential circuits do we have? State and briefly describe them**. (4** **marks)**

3a) Briefly describe a **Full-Adder. *(4 marks)***

b) Draw the block representation of a Full-Adder. ***(2 marks)***

c) State the two basic operations performed on memories and the signals typically used to support them. ***(6 marks )***

4a) State the classifications of FLASH Memory operations. ***(1½ marks)***

b)State any three (3) benefits of using high level programming language. ***(1½ marks)***

c) Convert the following binary numbers to decimal:

(i) 10110.101 (ii) 1111.111 (iii) 110100100

 ***(7½ marks)***

d) Convert 11010010000012 to hexadecimal ***(1½ marks)***

5a) 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)***

6a) State the similarities in the operations of a NAND-based S-R latch and a NOR-based S-R latch ***(6 marks)***

b) Enumerate any six (6) commands in assembly language that allows instructions to be processed when debugging a program. ***(6 marks)***