



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

DEPARTMENT OF DIGITAL TECHNOLOGY

EXAMINATION PAPER

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| COURSE CODE | : | CDT 211 |
| COURSE TITLE | : | Digital Logic |
| SPECIAL REQUIREMENTS | : | None |
| DURATION | : | 3 Hours |
| LEVEL | : | 2.1 |
| DATE | : | March 2021 |

INSTRUCTIONS TO CANDIDATES:

1. This paper has five questions and you are required to answer any **four**.
2. Number your answers accordingly.
3. You are required to answer questions clearly and logically, with headings and subheadings where necessary.
4. Each question has 25 marks.

QUESTION 1

- (a) Discuss in detail, the working of Full Adder logic circuit and extend your discussion to explain a binary adder, which can be used to add two binary numbers. [14marks]
- (b) What is a flip-flop? What is the difference between a latch and a flip-flop? List out the application of flip-flop. [6 marks]
- (c) What is the difference between static and dynamic RAM. [5 marks]

QUESTION 2

- (a) Distinguish between ROM, PROM, EPROM, EEPROM. [8 marks]
- (b) What is a universal gate? Give examples. Realize the basic gates with any one universal gate. [8 marks]
- (c) What is ROM? Is the ROM a volatile memory? Explain. [4 marks]
- (d) Explain briefly, why dynamic RAMs require refreshing? [1 mark]
- (e) What is a Decoder? Compare a decoder and a demultiplexer with suitable block diagrams. [4 marks]

QUESTION 3

- (a) Distinguish between combinational logic circuits and sequential logic circuits. How are the design requirements of combinational circuits specified? [10 marks]
- (b) What is a digital multiplexer? Illustrate its functional diagram. [7 marks]
- (c) Explain the operation of 8:1 multiplexer. [8 marks]

QUESTION 4

- (a) What is parity generator and checker? Describe five bit even parity checker. [8 marks]
- (b) What are basic properties of Boolean algebra? [4 marks]
- (c) Write the design procedure for combinational circuits. [5 marks]
- (d) Write down the steps in implementing a Boolean function with levels of NAND Gates. [6 marks]
- (e) What are the classifications of sequential circuits? [2 marks]

QUESTION 5

- (a) Calculate the denary number of this binary expressed in 2's complement 11101101 [5 marks]
- (b) Simplify with Boolean Algebra $(x + y)(x + z)$ [5 marks]
- (c) State and show diagrammatically the gates required to build a half adder [5 marks]
- (d) A 4-bit synchronous counter uses flip-flops with propagation delay times of 15 ns each. State the maximum possible time required for change of state [4 marks]
- (e) Convert to hexadecimal number for 95 base 10 [5 marks]
- (f) State the process of entering data into a ROM [1 mark]