UNIVERSITY OF ESWATINI

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION

APRIL 2021

TITLE OF PAPER: COMMUNICATION FUNDAMENTALS

COURSE CODE: CSC121

TIME ALLOWED: 3 HOURS   TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES:

1. All questions carry equal marks.
2. Answer **ALL** questions. The paper has **FIVE** questions.
3. Marks for each question are indicated in square brackets.
4. Show all your workings where necessary.

THIS EXAMINATION PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN
GRANTED BY THE INVIGILATOR

Question 1

(a) Define the following terms. [5]

    (i) Hyperthreading

    (ii) Virtualization

    (iii) POST

    (iv) Pipelining

    (v) Sum of Products (SOP)

(b) Discuss the design considerations of the BTX motherboard which makes it superior to the ATX motherboard. [4]

(c) What is the function of a CMOS battery? [1]

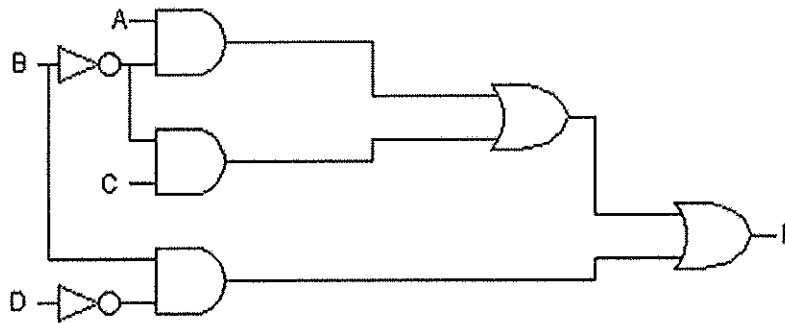(d) Discuss the evolution of computers from first generation to fifth generation. [10]

Question 2

(a) What is the function of the BIOS chip in a computer system? [2]

(b) What is the danger of having a computer with a high clock speed? [1]

(c) Differentiate between static RAM and dynamic RAM. [3]

(d) Discuss what ROM is. [2]

(e) Discuss one difference between hyperthreading and grid computing. [2]

(f) Discuss the following;

    (i) CPU cache memory. [3]

    (ii) CPU registers. [2]

(g) How much memory does a computer need to store one character in computer memory? [1]

(h) What is the word represented by the binary string 01000011011000010111010. N.B. The ASCII decimal values for character 'A' is 65 and 'a' is 97. [4]

Question 3

(a) Discuss the two types of hypervisors.   [4]

(b) Discuss the computer boot-up process.   [6]

(c) How is the paging file different from RAM?   [2]

(d) What is cloning? How can I help solve software issues?   [2]

(e) State the four operating system installation prerequisites?   [4]

(f) The operating system provides hardware independence. What do we mean by hardware

independence?   [2]

Question 4

(a) What is the function represented by this digital circuit? Simplify it if possible.   [4]

(b) Draw the reduced circuit of the following function.   [10]

$$f(a, b, c, d) = \sum (3, 5, 7, 8, 9, 12, 13, 15)$$

(c) Discuss three advantages of digital electronics over analog electronics.   [6]

Question 5

(a) Discuss two functions of the network layer? [4]

(b) Discuss four differences between the two network layer protocols? [4]

(c) State the functions of each of the following protocols. [3]

    (i)   Domain Name Service

    (ii) Dynamic Host Configuration Protocol

    (iii) Transmission Control Protocol

(d) Which layer of the network protocol suites establishes a connection between two communicating devices? [1]

(e) What is the function of a firewall in a network? [2]

(f) Compare and contrast a virus and a worm. [2]

(g) List the four characteristics of a reliable network. [4]