BINDURA UNIVERSITY OF SCIENCEEDUCATION

FACULTY OF SCIENCEAND ENGINEERING

DEPARTMENT OF EDUCATIONAL TECHNOLOGY

CS113/EDT113 Computer Organization and Architecture

Time 3 hours

Instruction to candidates – AUG 2024

Answer all questions, each question carries 20 marks

Question 1

a. Define computer memory. **[2]**

b. Explain what is meant by:

i. Primary storage giving an example. **[3]**

ii. Secondary storage giving an example. **[3]**

iii. Online storage giving an example. **[4]**

c. The following machine code instruction is stored in a location in main memory

1	1	1	1	1	0	1	0	1	0	0	1	0	1	1	1

convert the primary pattern into hexadecimal. **[4]**

d. Explain why the programmer would prefer to see the contents of the location displayed in (c) above as hexadecimal rather than binary when debugging his program that reads the key presses. **[4]**

Question 2

a. Name and describe three buses used by Von Neumann architecture. **[5x3]**

b. Draw a NOR logic gate and present its truth table **[5]**

Question 3

a. Explain the difference between interrupt and polling. **[5]**

b. Why do we require interrupt? **[5]**

c. Consider the following reference string: **1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5**. Using the least recently used (LRU) page replacement algorithm with 3-page frames:

i. Determine the pages that are resident in cache after each page reference. **[6]**

ii. Find number of page faults. **[2]**

iii. Find the number of hits. **[2]**

Question 4

a. Compare and contrast virtual memory and physical memory. **[8]**

b. List any **three** limitations of virtual memory. **[6]**

c. Differentiate Computer Organization from Computer Architecture. **[6]**

Question 5

a. What is instruction format? **[2]**

b. Discuss different types of instruction formats. **[8]**

c. Arrange and explain the order of memory devices based on the access time, cost and capacity. **[10]**