

UNIVERSITY OF SWAZILAND

Faculty of Science and Engineering
Department of Computer Science

MAIN EXAMINATION

May 2018

Title of Paper: COMPUTER ORGANISATION AND ARCHITECTURE II

Course Code: CSC 321 / CS 341

Time Allowed: 3 Hours

Total Marks: 100

Instructions to Candidates:

This Question Paper Consists of FIVE (5) Questions. Answer All the FIVE (5) Questions.

Marks are indicated in Square Brackets.

NB: You are not allowed to open this examination paper until permission has been granted by the invigilator

QUESTION ONE**[20 MARKS]**

- a) Define the terms:
 - i. Computer Architecture. [2 Marks]
 - ii. Computer Organization [2 Marks]
- b) What is virtual memory? Explain the need for virtual memory. [4 Marks]
- c) In a shared memory system, explain two schemes to maintain cache-coherence. [4 Marks]
- d) Define hit rate and miss rate. [4 Marks]
- e) Discuss Direct Memory Addressing in details [4 Marks]

QUESTION TWO**[20 MARKS]**

- a) Explain the Following:
 - i. Latency. [2 Marks]
 - ii. Buses [2 Marks]
- b) Give the difference between RISC and CISC. [4 Marks]
- c) List any TWO types of dependencies? [2 Marks]
- d) What is an interrupt? What are the uses of interrupts? [4 Marks]
- e) Explain the three kinds of data hazards
 - i. Read-after-write (RAW) [2 Marks]
 - ii. Write-after-write (WAW) [2 Marks]
 - iii. Write-after-read (WAR) [2 Marks]

QUESTION THREE**[20 MARKS]**

- i. What is Cache Memory? Explain the difference between Primary Cache and Secondary Cache. [5 Marks]
- ii. what is the difference between Direct mapping and Associative mapping [4 Marks]
- iii. What is a stack? Explain the two operations of a stack. [5 Marks]
- iv. Explain any **THREE** Operating system services. [3 Marks]
- v. Briefly explain the following
 - a. Long-Term Scheduler [1 Mark]
 - b. Short-Term Scheduler [1 Mark]
 - c. Medium-Term Scheduler [1 Mark]

QUESTION FOUR**[20 MARKS]**

- i. Discuss the three different kinds of branches:
 - a. Forward conditional branches [2 Marks]
 - b. Backward conditional branches [2 Marks]
 - c. Unconditional branches [2 Marks]
- ii. Explain the two ways that a stack can be implemented in digital computers:
 - a. Register Stack and [3 Marks]
 - b. Memory Stack [3 Marks]
- iii. Explain any **FOUR** different types of Processor Registers [4 Marks]
- iv. List four Advantages of Assembly Language [4 Marks]

QUESTION FIVE

[20 MARKS]

- i. What is the use of the following instruction set examples :
 - a. ADD [1 Marks]
 - b. COMPARE [1 Marks]
 - c. IN [1 Marks]
 - d. JUMP [1 Marks]
 - e. JUMP IF [1 Marks]
 - f. LOAD [1 Marks]
 - g. OUT [1 Marks]
 - h. STORE [1 Marks]
- ii. Explain the following:
 - a. Variable Instruction Formats [2 Marks]
 - b. Fixed Instruction Formats [2 Marks]
- iii. The techniques to specify the address of data are called Addressing Modes. Discuss any four of these techniques. [4 Marks]
- iv. Define the following terms:
 - a. parallel processing [2 Marks]
 - b. Sequential circuits. [2 Marks]