00175

THE OPEN UNIVERSITY OF SRI LANKA

B.Sc (IT) DEGREE PROGRAMME

LEVEL 04

COU4304 – Computer Architecture

Final Examination Paper: 2024/2025

Duration: Two hours only (02 hours)

Date: 16.06.2025 Time: 9.30 am – 11.30 am

INSTRUCTIONS TO CANDIDATES

- **Duration** of the examination is **two (02)** hours.
- This paper contains **Six (06)** questions and **Three (03)** pages.
- The students should answer **any four (04)** Questions Only.
- All the questions carry equal marks.
- Write your **index number** clearly on the **cover of the answer book** and on **all extra sheets used.**
- Clearly indicate the **question numbers** you are attempting in your answer script.
- **Begin** each answer on a **new page.**
- All answers **must be written in English.**
- **Do not use red pens.** Only **blue** or **black** pens are allowed for writing answers.
- **Tie all additional sheets** securely to your main answer script before handing it in.
- **This is a closed-book examination. No reference materials, textbooks, or electronic devices are allowed.**
- Candidates are reminded to maintain **academic integrity.** Any form of **cheating or misconduct will result in disciplinary action.**

Answer FOUR Questions ONLY.

**Question 01**

a) Define the terms 'computer architecture' and 'computer organization'. [04 Marks]

b) State the main characteristics of Von Neumann Architecture. [03 Marks]

c) Name and define the elements of a machine instruction. [08 Marks]

d) Explain the following services offered by an Operating System.

i. Program creation

ii. Program execution

iii. Access to I/O devices

iv. Controlled access to files

v. System access [10 Marks]

**Question 02**

a) Name the three (03) structural components of CPU. [03 Marks]

b) Name and define the three (03) types of buses. [06 Marks]

c) State the functions of below registers.

i. Memory Buffer Register (MBR)

ii. Memory Address Register (MAR)

iii. Instruction Register (IR)

iv. Memory Data Register (MDR) [08 Marks]

d) Mention and briefly explain the four (04) types of scheduling. [08 Marks]

**Question 03**

a) Define the term 'multicore processor'. [03 Marks]

b) State the computer generation and the relevant technology associated with it. [12 Marks]

c) Name and briefly define the three (03) key interfaces of a typical computer system. [06 Marks]

d) Define the following terms related to disk performance parameters.

i. Seek time

ii. Rotational delay

iii. Access time

iv. Transfer time [04 Marks]

**Question 04**

a) What is referred to as a 'disk'? [02 Marks]

b) The registers in the processor perform two (02) roles. Briefly explain them. [04 Marks]

c) An instruction cycle includes the three (03) stages. Define them. [09 Marks]

d) Draw the instruction cycle state diagram. [10 Marks]

**Question 05**

a) Name the three (03) types of hazards. [06 Marks]

b) What are the major functions of I/O interface? [06 Marks]

c) Define the term 'cloud computing'. [05 Marks]

d) Define the following terms related to SPEC documentation.

i. Benchmark

ii. Reference machine

iii. System under test

iv. Speed metric [08 Marks]

**Question 06**

a) Mention five (05) physical characteristics of disk systems. [05 Marks]

b) Mention three (03) advantages of segmentation. [06 Marks]

c) Name and define the two (02) types of operating systems. [06 Marks]

d) Evaluate the following program with one-address instruction. [08 Marks]

$$X = \frac{A - B + C * (D * E - F)}{G + H * K}$$