



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEM

IIT3123: COMPUTER SYSTEMS ARCHITECTURES

Attempt Question ONE and ANY other TWO Questions

QUESTION ONE (30) COMPULSORY

- a) Design a 4-input (A,B,C,D) digital circuit that will give at its output (X) a logic 1 only if the binary number formed at the input is between 2 and 9 (including). 12 Marks
- b) State the limitations of using Boolean algebra simplification method of logic expression 2 Marks
- c) Briefly explain the Instruction Cycle, use a flowchart diagram 4 Marks
- d) Explain the following terms as used in computer architecture and organization
 - i) Assembler
 - ii) Compiler
 - iii) Machine Interpretation6 Marks
- e) Explain Instruction Level Parallelism (ILP) as applied to computer architecture? 3 Marks
- f) Program counter is a register within the CPU; briefly state its core functions. 3 Marks

QUESTION TWO (20)

- a) Draw a block diagram of a sequential circuit and explain how it works 5 Marks
- b) Assuming that you are trying to fetch the instruction at memory location 2005 in an 8085 processor. That means that the Program Counter is set to that value; identify the sequence of operations. 5 Marks

- c) How can the instruction execution speed of CPU be increased? 3 Marks
- d) Briefly define the terms computer architecture and computer organization 4 Marks
- e) How do modern computers conform to Von Neumann architecture 3 Marks

QUESTION THREE (20)

- a) Briefly explain a deadlock 2 Marks
- b) What is the difference between a deadlock and starvation? 4 Marks
- c) Differentiate between explicit and implicit parallelism 3 Marks
- d) State the four conditions required for deadlock to occur; briefly explain each condition 6 Marks
- e) What do you understand by single-user contiguous scheme in memory management 3 Marks
- f) State two disadvantages of single-user contiguous scheme 2 Marks

QUESTION FOUR (20)

- a) Explain the term interrupt as applied to computers stating why it is needed. 3 Marks
- b) Differentiate between multitasking and multiprogramming 4 Marks
- c) What factors should be considered to choose a victim when trying to recover from deadlock? 4 Marks
- d) Define the following terms as applied to computer architecture and organization: i) Starvation and ii) I/O Channel iii) Virtual Memory 6 Marks
- e) What is Cache memory and why is it necessary in the computer 3 Marks

QUESTION FIVE (20)

- a) State the five Key tasks performed by an operating system in file management 5 Marks
- b) Discuss the mechanism for interrupt handling of I/O operations 5 Marks
- c) Briefly discuss the four real memory management techniques 8 Marks
- d) State any two ways of reducing external fragmentation in memory management 2 Marks

