



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER
SCIENCE

SCO 201: COMPUTER ORGANIZATION AND ARCHITECTURE 11

2ND SEMESTER 2023/2024

TIME: 2HOURS

INSTRUCTIONS: Answer questions ONE and any other TWO questions

Question One is Compulsory and carries 30Marks. The remaining questions carry 20marks each.

QUESTION 1

A) Define the following terms:

- i. Computer architecture (1 mark)
- ii. Access time (1 mark)
- iii. Stripe (1 mark)
- iv. Solid state drive (1 mark)
- v. Peripheral device (1 mark)

B) What is the general relationship among access time, memory cost, and capacity? (3 marks)

C) What are the key properties of semiconductor memory? (3 marks)

D) In the context of RAID, what is the distinction between parallel access and independent access? (3 marks)

E) Draw a well labeled diagram of a magnetic disk data layout explaining each part. (8 marks)

F) Give FOUR reasons why peripherals are not connected directly to the system bus (8 marks)

QUESTION 2

- a) Explain the three broad classifications of external devices (3 marks)
- b) The control of the transfer of data from an external device to the processor involves 5 sequence of steps, Explain them. (10 marks)
- c) Justify why RAID level 0 is not a true member of the RAID family. (2 marks)
- d) Explain the term *striped data*. (2 marks)
- e) Outline 3 common characteristics that are shared by all RAID levels? (3 marks)

QUESTION 3

- a) List four types of I/O commands that an I/O module may receive when it is addressed by a processor. (8 marks)
- b) Consider a disk with an advertised average seek time of 4 ms, rotation speed of 15,000 rpm, and 512-byte sectors with 500 sectors per track. Suppose that we wish to read a file consisting of 2500 sectors for a total of 1.28 Mbytes. Calculate the total time for the transfer. (8 marks)
- c) Explain the two distinctive types of flash memory. (4 marks)

QUESTION 4

- a) Draw a well labeled diagram of Generic I/O module and explain its Two main functions (4marks)
- b) List TWO drawbacks of Programmed and Interrupt-Driven I/O (4marks)
- c) When a device interrupt occurs, how does the processor determine which device issued the interrupt? (3 marks)
- d) Differentiate between memory-mapped I/O and isolated I/O? (4 marks)
- e) On a typical microprocessor, a distinct I/O address is used to refer to the I/O data registers and a distinct address for the control and status registers in an I/O controller for a given device. Such registers are referred to as ports. In the Intel 8088, two I/O instruction formats are used. In one format, the 8-bit opcode specifies an I/O operation; this is followed by an 8-bit port address. Other I/O opcodes imply that the port

address is in the 16-bit DX register. How many ports can the 8088 address in each I/O addressing mode? . (5 marks)

QUESTION 5

- a) Draw a well labeled diagram of a Winchester disk format (5 marks)
- b) Write a comparative summary of the seven levels citing Advantages, Disadvantages and application of each level. (10 marks)
- c) Draw a well labeled structure of Von Neumann Machine and Outline the function of each part (5marks)