

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
COMPUTER SCIENCE DEPARTMENT**

APRIL EXAMINATIONS 2009

COURSE: COMPUTER ARCHITECTURE
CODE: SCS2102

INSTRUCTIONS TO CANDIDATES

Answer any five of the seven questions below

3 hours

QUESTION ONE

- a) Describe the von Neumann architecture outlining the main components of a computer that subscribes to the architecture. [6]
- b) With the aid of a diagram, describe the flag registers of the 8085 microprocessor [10]
- c) Explain the structure an assembly language with the aid of an example. [4]

QUESTION TWO

- a) (i) Describe the general purpose registers of the 8085 [8]
(ii) The 8085 data bus is multiplexed. Explain the underlying concept. [3]
- b) Outline the advantages and disadvantages of the following RAM types
- i) Dynamic RAM [5]
ii) Flash Memory [4]

QUESTION THREE

- a) The following are the basic components of a ROM IC:
row decoder, column decoder, register array and output buffer
Explain how each of the components works. [6]
- b) What is an accumulator and for what process is it used for in microprocessor systems? [6]

- c) Explain what the following instruction in assembly language does: **LXI H,0520H** [3]
(i) What is the addressing mode that the above instruction uses? [3]
(ii) How many bytes of memory will the above instruction use? [2]

QUESTION FOUR

- a) (i) Some of the pins of the 8085 are tri-stated. Explain the concept of tristate. Give an example of pins that are tristated in the 8085 processor. [4]
(ii) Write in assembly language a program that loads the accumulator with the data byte 82H and then save the data in register B. [5]
- b) Describe the function of the following 8085 pins:
(i) RD
(ii) READY
(iii) HOLD
(iv) WR [4]
- c) Calculate the vector address of interrupt service routine for the interrupts **RST6.5** [3]
- d) Give the control signals used for demultiplexing the address data bus of the 8085 [4]

QUESTION FIVE

- a) Draw a sketch of how the 8085 can be interfaced with the 8755 EPROM with I/O, taking into consideration that the 8755 provides 2Ks worth of 8-bit bytes of UV-erasable EPROM, and two 8-bit-wide bi-directional parallel I/O ports and a 5 volt supply. Show the outstanding pins of each IC. [10]
- b) Compare and contrast the instructions Read Interrupt Mask and Set Interrupt Mask [10]

QUESTION SIX

- a) What is the difference between a *microprocessor* and a *microcomputer* [3]
- b) If the memory chip size is 1024 x 4bits, calculate how many chips are required to make up 2Kbytes of memory. [4]

- c) Distinguish between hardware and software interrupts of the 8085 giving appropriate examples. [6]
- d) With as much detail as possible, explain the functions of the status signals S0 and S1 [7]

QUESTION SEVEN

Describe the 8085 interrupt system taking into account the following concepts where appropriate:

- priority
- mask
- level and edge activated
- polled and vectored [20]

END OF QUESTION PAPER

