



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE IN COMPUTER ENGINEERING
SCE 428 : MICROPROCESSOR SYSTEM AND APPLICATIONS

DATE: THURSDAY 12TH APRIL 2012

TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS

Answer Question ONE (COMPULSORY) and any other TWO questions

Question 1 (30 marks)

- a) What do you understand by the term TRI STATE DEVICE? (2 marks)
- b) i) Define stack and explain stack related instruction. (2 marks)
ii) How many addressing lines are necessary for addressing 2K bytes memory locations? (4 marks)
- c) List some microprocessor applications. (3 marks)
- d) Explain the functions of Data Bus and Control bus of a microprocessor. (4 marks)
- e) What is the importance of an ALU register and ALE signal in 8085 microprocessor? (4 marks)
- f) What is the difference between microprocessor and microcontroller? (4marks)
- g) Mention 4 types of machine cycles in the 8085. (4 marks)
- h) What are assembler directive? (3 marks)

Question 2 (20 Marks)

- a) What are the various programmed data transfer methods? (2 marks)
- b) What is a BUS in relation to microprocessor systems? (2 marks)
- c) (i) Performance analysis helps to answer questions such as how first can a program be executed using a given computer. Give brief explanation of what is needed in order to answer such a question. (4 marks)

- ii) As the systems engineer in your organisation you need to buy microprocessor based machines. The vendors have brought to you 2 types of machines A and B of which the following performance measures have been recorded when executing a set of benchmark programs.

INSTRUCTION CATEGORY	PERCENTAGE OF OCCURENCE		No. OF CYCLES PER INSTRUCTION	
	A	B	A	B
ALU	38	35	1	1
Load and Store	15	30	3	2
Branch	42	15	4	3
Others	5	20	5	5

Calculate the rate of instruction execution per unit time (MIPS) for both machines to determine the machine you would choose assuming a clock rate of 200MHz.

(12 marks)

Question 3 (20 Marks)

- a) Draw a block diagram which shows the 4 (four) wires that connects the microprocessor to the memory. (4 marks)
- b) For each wire shown in (a), give a brief of its function. (4 marks)
- c) What do you understand by the term **Multiplexing** in relation to microprocessor bus? (2 marks)
- d) Sketch a CONTROL signal generator using logic gates showing the inputs and subsequent expected outputs. (10 marks)

Question 4 (20 Marks)

- a) What is machine and assembler language in relation to microprocessor system? (4marks)
- b) Using appropriate block diagrams explain the Load and Store instruction cycles. (4 marks)

- c) A certain IBM PC/XT compatible turbo computer has a crystal of 24-MHZ frequency for X1, X2 inputs to the 8244. Calculate the frequencies provided by the outputs. (4 marks)
- d) i) What do you understand by the PRIMARY MEMORY in computers, and what is its main requirement? Give 2 examples of such memories. (4 marks)
- ii) A given memory chip has 12 address pins and 4 data pins find the ORGANISATION and the CAPACITY. (4 marks)

Question 5 (20 Marks)

- a) Give the names and a brief explanation of the at least 4 types of memory addressing modes. (8 marks)
- b) Draw a block diagram of how a CPU carries out an assembly and execution of a program and give a brief of what each block does. (4 marks)
- c) The assembler uses 3 tables to perform its functions, name them and give a brief for each. (4 marks)
- d) You have been given some program as follows;
- ```
MOV A, #3CH
MOV R4, #66H
ANL A,R4
```
- Explain the contents of the accumulator after execution of the program segments. (4 marks)

