



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (TELECOMMUNICATION AND INFORMATION TECHNOLOGY)

SPH 434 MICROPROCESSORS APPLICATIONS 1

DATE: 11/8/2021

TIME: 2:00 – 4:00 PM

INSTRUCTIONS:

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) What does this instruction mean?
MOV AL, ARRAY [SI] (3 marks)
- b) How would the flags be set If you were to add the binary numbers 10111101_2 and 00111110_2 ? (7 marks)
- c) List the segment registers and their functions (4 marks)
- d) Differentiate program counter and instruction register (4 marks)
- e) Give the main sections/units of an intel 8088 microprocessor and their functions (3 marks)
- f) What makes microprocessors different from microcontrollers? Draw the basic architecture of a microprocessor. (7 marks)
- g) If CX contains the binary value $0110\ 1101\ 0110\ 1011_2$, what value does CH have? (2 marks)

QUESTION TWO (20 MARKS)

- a) Giving an example of each, differentiate indexed addressing mode from based addressing mode (4 marks)
- b) What are the 3 key things used to differentiate microprocessors? (6 marks)
- c) List 6 functions of a microprocessor (6 marks)
- d) What's the purpose of summing the segment and pointer registers to access a single, physical memory address. (4 marks)

QUESTION THREE (20 MARKS)

- a) Discuss the different types of microprocessor buses. (6 marks)
- b) Discuss the 3 phases of a microprocessor execution process (6 marks)
- c) The control unit of a microprocessor has circuits used to generate signals which select the operation of the ALU. Discuss these circuits for a simple microprocessor with registers A, B and C. (8 marks)

QUESTION FOUR (20 MARKS)

- a) Discuss the 6 status flags of the flag register (12 marks)
- b) Explain the instruction below and give the general expression of the physical address of the source operand. (8 marks)

MOV AH,[BX]. BETA [SI]

QUESTION FIVE (20 MARKS)

- a) What are the main functions of the control logic of the microprocessor? (6 marks)
- b) Discuss the following functions of the intel 8088 microprocessor pins (10 marks)
 - i) $\overline{RD}$
 - ii) INTR
 - iii) CLK
 - iv) RESET
 - v) NMI
- c) Give 8 functions of the ALU (4 marks)