(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

MAIN EXAMINATIONS
YEAR FOUR SEMESTER TWO EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

COURSE CODE   :   CSC 450E

COURSE TITLE   :   MICROPROCESSOR
                        SYSTEMS DESIGN

DATE:27/04/2023   TIME:2.00PM-4.00PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a) Higher speed of a processor does not automatically translate to higher performance, discuss.
(4 marks)

b) Define the term "pipelining" and state any four hardware requirement for a processor design to realise pipelining.
(5 marks)

c) Discuss the superscalar microarchitecture design of a microprocessors chip. (5 marks)

d) Explain multitasking as a form of data processing and state its merit
(4 marks)

e) Explain how the following challenges affecting efficiency of pipelining
(4 marks)

    i. Branch prediction

    ii. Memory latency

f) Discuss how instruction dependency affects parallelism and state how it is avoided in microprocessor design.
(4 marks)

g) Describe the working principal of cache memory
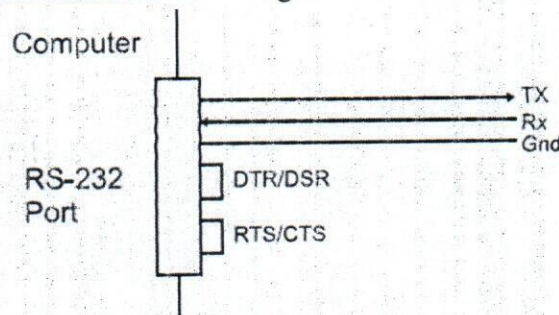(4 marks)

SECTION B
QUESTION TWO

a) With the help of a suitable diagram, illustrate the interfacing of the PPI-8255 to the 8085 microprocessor.
(10 marks)

b) Configure the PPI such that port A becomes input, port B is output and Port C is output. Read data on port A and save in reg B and send 01010101 to port B. The functions of control register bits are as shown below
(10 marks)

D7	D6	D5	D4	D3	D2	D1	D0
1=Mode 0 I/O Mode	Mode selection 00 = Mode 0 01 = Mode 1 1X = Mode 2		Port A 1=input 0=output	Port C (PC7-PC4) 1=input 0=output	Mode Selection 0=Mode 0 1=Mode 1	Port B 1=input 0=output	Port C (PC3-PC0) 1=input 0=output

QUESTION THREE

a) Highlight any two causes and two effects of memory errors
(8 marks)

b) Outline three types of bus classification in computer systems interfacing
(6 marks)

c) Fig 1 below shows the RS-232 port. Write brief notes on the function and uses of RS-232 standard. State the functions of the signals marked Tx , DTR/DSR and Rx
(6 marks)

QUESTION FOUR

a) Outline four application areas of microcontrollers
(4 marks)

b) With an illustrative diagram, clearly show how an external 64K RAM can be interfaced with a microcontroller
(10 marks)

c) Describe the process details during the following phases of an instruction cycle:

    i) fetch phase
(6 marks)

ii) decode phase
iii) execute phase

QUESTION FIVE
a) Discuss the salient features of the Ethernet bus standards (6 marks)
b) Highlight prominent features and applications of the SATA bus standards. (5 marks)
c) Discuss the critic function of the Northbridge chip in a computer bus system. (4 marks)
d) Identify the five roles of computer buses (5 marks)