(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR ONE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE
COMPUTER SCIENCE

COURSE CODE : CSC 453E

COURSE TITLE : COMPUTER SYSTEMS ENGINEERING

DATE: 17/02/2019 TIME: 02:00 P.M – 04:00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE [COMPULSORY][30 MARKS]

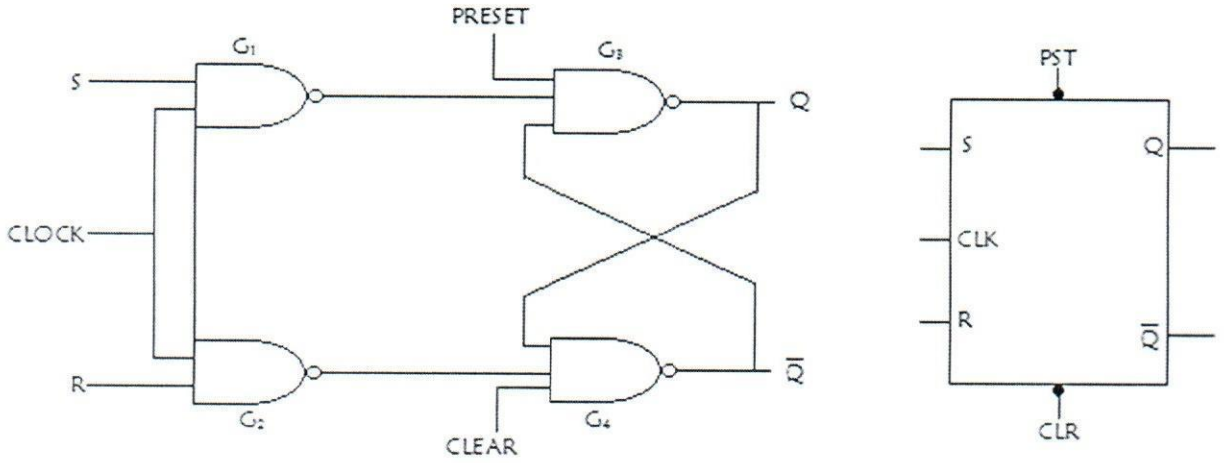
(a) Explain any two applications of decoders **[2marks]**

(b) Differentiate between digital and analogue numerical representation **[2marks]**

(c) Give examples of CISC and RISC **[4marks]**

(d) State five applications of Microcontrollers **[5marks]**

(e) The diagram below shows a clocked R-S Flip- Flop with PRESET and CLEAR inputs. The CLOCK modifies the flip-flop to be used as a synchronous circuit. The clock makes the flip-flop to SET and RESET at precise times implying synchronous circuit. The PRESET and CLEAR inputs work independently and have priority over data of the CLOCK inputs. Draw the timing diagram for this circuit giving clear explanation of when the flip-flop is in SET or PRESET state. **[8marks]**



(f) Outline the steps involved in the design of a Combinational Circuit **[4marks]**

(g) Use two-input XOR gates to produce the parity generation and checking systems to ensure the four-bit data sent over a serial link is transmitted and received as an odd parity word. **[3 Marks]**

(h) What type of software controls the internal operations of the computer's hardware? **[2marks]**

QUESTION TWO [20 MARKS]

(a) Consider the instruction to load the accumulator with a bit of data 6CH (data stored), H implies Hexadecimal, from the memory location 2ØØØH (address of move) in the RAM. (Refer to the Z80 microprocessor Architecture) **[8marks]**

(b) A few microcontrollers may utilize four-bit expressions and work at clock rate frequencies, what do these usually include **[6marks]**

(c) (i) Define a decoder **[1mark]**

(ii) Using a 3-to-8 line decoder, draw the truth table **[5marks]**

QUESTION THREE [20 MARKS]

(a) Differentiate between;

(i) Asynchronous and Synchronous counters

(ii) UP, DOWN and UP/DOWN counters **[2marks]**

(iii) Presettable and clear counters **[2marks]**

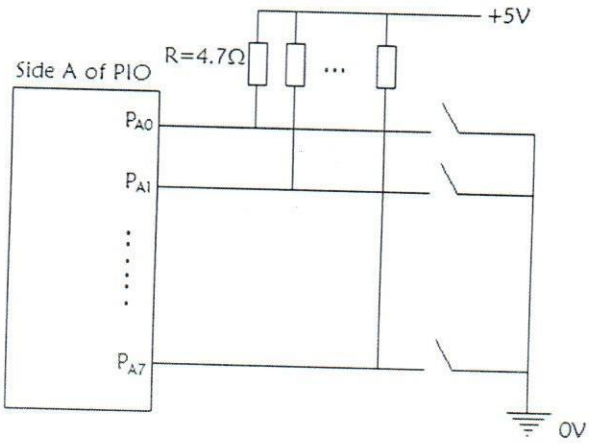
(iv) BCD and decade counter **[2marks]**

(a) What is the difference between a compiler and an interpreter? **[2marks]**

(b) Differentiate between software and hardware engineering **[2marks]**

(c) Consider a 1024X8 bit ROM. 10 address lines addressing $2^{10} = 1024$ locations, Discuss its function of block diagram **[4marks]**

(d) Write a program that puts the bit of data from the eight switches below through the side A of the Z80 PIO **[6marks]**



QUESTION FOUR [20 MARKS]

(a) Discuss the following in reference to a basic data communications system **[4marks]**

(i) Source

(ii) Medium

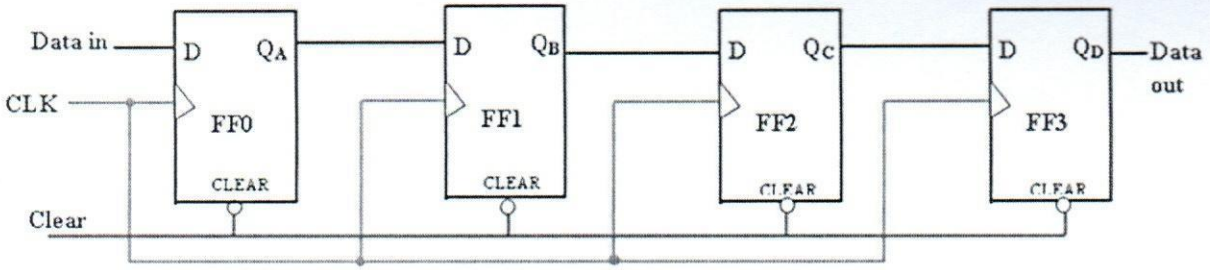
(iii)Destination

(b) Describe the microcontroller **[2marks]**

(c) Design an AND gate using NOR gate **[4marks]**

(d) The figure below shows a four bit Series in Series Out register. Draw the timing diagram **[4marks]**

(e) Discuss any three major criteria that a Data Communication Network must meet[6marks]



QUESTION FIVE [20 MARKS]

(a) Briefly describe how Microcontrollers are classified **[7marks]**

(b) Describe the Typical Application Circuit of PIC16F877A **[5marks]**

(c) Give any two applications of Renesas Microcontroller **[2marks]**