ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION   SUMMER SEMESTER, 2022-2023
DURATION: 1 HOUR 30 MINUTES   FULL MARKS: 75

CSE 4619: Peripherals and Interfacing

Programmable calculators are not allowed. Do not write anything on the question paper.
Answer all 3 (three) questions. Figures in the right margin indicate full marks of questions with
corresponding COs and POs in parentheses.

1. a) Write short notes on fixed and variable addresses. Explain the memory-mapped I/O with   5 + 5
        an appropriate scenario where port #02h is connected with a DIP switch and port #05h is   (CO1)
        connected with a colored LED.   (PO1)

    b) What is Harvard Architecture for microcontroller design? Explain the functions and appli- 2 + 6
        cations of appropriate pins of ATMega16 microcontroller for analog I/O and external clock   (CO1)
        input operation.   (PO1)

    c) Differentiate between a microprocessor and microcontroller. What should be an extremely   5 + 2
        mega microcontroller's name if it is manufactured by ATMEL along with 512 Kbyte of flash   (CO1)
        memory?   (PO1)

2. a) What is the significance of input weights in an A/D or D/A convertor? Discuss the function 5 + 5
        of the comparator in the ADC.   (CO3)
                                                                                                  (PO1)

    b) Consider a Successive Approximation A/D converter with $V_{in} = 0.7$ Volt, $V_{ref} = 1$ Volt, and 5 + 3
        8-bit of resolution. Find the 8-bit digital output of this converter. Also, find the analog value (CO4)
        for that digital output using the Weighted Sum D/A conversion method.   (PO1)

    c) Discuss the advantage(s) of R/2R ladder DAC over those that use binary weighted resistors? 3 + 4
        An 8-bit D/A converter produces $V_{OUT} = 0.25$ Volts for a digital input of 10000001. Find (CO4)
        the value of V_{in} for an input of 11110000.   (PO1)

3. a) Suppose, an 8086 microprocessor is asked to address two 8255 ICs (i.e., 16th and 48th) se- 5 + 5
        quentially and write control words at the control register of those ICs, respectively. In both (CO4)
        8255 ICs, Port-A is in Mode-2, Port B is in Mode-1 as an output port and Port-C is handshak- (PO1)
        ing mode. Now, to address the control registers of both the 8255 ICs, derive the sequential
        binary values of $A7 - A0$ pins and draw the respective control words.

    b) Write a structure of assembly language code for IC 8155 (i.e., compatible with IC 8085) to   8
        show a single bit input-output operation based on the I/O port scenario given in Question 3.a. (CO2)
                                                                                                  (PO2)

    c) Draw a timing diagram of a 8255 PPI when its Port-A is used as input port having interrupt 5 + 2
        request with a 8-bit data of all 0, Port-B is used as output port having no interrupt request   (CO1)
        with a 8-bit data of all 1, and Port-C is in the handshaking mode. Also, derive the command (PO1)
        register value.