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

SEMESTER FINAL EXAMINATION **SUMMER SEMESTER, 2020-2021**

DURATION: 3 HOURS **FULL MARKS: 150**

CSE 4619: Peripherals and Interfacing

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer **all 6 (six)** questions. Marks of each question and corresponding CO and PO are written in the right margin with brackets.

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1. a) What is an Embedded System? How does it differ from typical Computer Systems? 10 (CO1) (PO1)

   b) What is Daisy-Chain Arbitration? Write its pros and cons. 8 (CO1) (PO1)

   c) In order to connect a Dot-Matrix Display with an 8086 Microprocessor system, how can you interface using a single 8255 PPI? Draw the interfacing diagram. 7 (CO4) (PO2)

2. a) What is meant by priority resolving for handling multiple interrupts? Which PIC is best suited with 8086 microprocessor? And why? 10 (CO2) (PO2)

   b) How can 8259 PIC handle 64 Interrupt levels? Explain with necessary diagram. 8 (CO2) (PO1)

   c) Draw the control word format for the 8255A PPI when Port-A is connected with a 7-Segment display and other ports are also in output mode. 7 (CO4) (PO1)

3. a) Describe DMA and its signals. Draw the diagram for logical pins and internal registers of the 8237 DMA controller. 10 (CO2) (PO2)

   b) "*Memory-Read & I/O Write* and *I/O Read & Memory-Write* signals are used simultaneously for DMA operation" –Explain. 8 (CO2) (PO2)

   c) Explain the use of Q1 and Q2 pins of 74HC373 latch while connecting it with an 8255 PPI. 7 (CO4) (PO2)

4. a) What is CAN bus and why is it called a broadcast type bus? "CAN bus protocol remove $\frac{n(n-1)}{2}$ connections complexity for an embedded system" – explain how? 10 (CO3) (PO1)

   b) How does CAN bus protocol encode the transmitted data? Write a short note on CAN bus characteristics and its logic states. 8 (CO3) (PO1)

c) Suppose, your student ID is 180041$\underline{X_1X_2X_3}$. Now, for CAN Bus Protocol consider two component nodes N_1 having 11-bit Identifier $\underline{X_1X_2X_3}$ and N_2 having 11-bit Identifier $\underline{X_3X_2X_1}$. Using the identifier values draw the timing diagram for CSMA/CD Non-Destructive Arbitration (NDA) concept of CAN. Your answer should clearly state the *bit-by-bit* scenario to show which node becomes the dominant to access the CAN Bus and transmit data first. 7 (CO3) (PO3)

5. a) What is I^2C Bus? Draw the data formats of I^2C protocol when the Master IC reads and writes to/from Slave IC. 10 (CO3) (PO1)

b) Draw the frame format of I^2C bus and briefly explain it. 8 (CO3) (PO2)

c) Why does in I^2C bus the Start-End condition and Data-Transition signaling are opposite to each other? Explain. 7 (CO3) (PO3)

6. a) Write the pros and cons of the *Serial* and *Parallel* interface transmissions. How does the I^2C bus handle multi-master scenario? 10 (CO1) (PO1)

b) How the use of Bluetooth, WiFi and 3G/4G do differs from each other in terms of designing wireless interfaces using IR and RF? 8 (CO3) (PO1)

c) "LoRaWAN devices send small amount of data for a longer distance" – Justify the statement with example. 7 (CO3) (PO1)