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

SEMESTER FINAL EXAMINATION **SUMMER SEMESTER, 2016-2017**

DURATION: 3 Hours **FULL MARKS: 150**

CSE 4639: Peripherals, Interfacing and Embedded Systems

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

There are **8 (eight)** questions. Answer any **6 (six)** of them.

Figures in the right margin indicate marks.

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1. a) What is I/O interfacing? Briefly categorize the internal and external interfacing concept with appropriate example. 10
   b) Explain about the handshake signals of 8155 Programmable Peripheral Interface (PPI). 10
   c) Write the working principle of *Delta-Sigma A/D* conversion method. 5

2. a) What is Daisy-Chain Arbitration? Write its pros and cons. 10
   b) Write a comparative analysis on *Weighted Sum* and R-2R Ladder DAC. 10
   c) Suppose, you are given a range of $V_{min}=0v$ and $V_{max}=24v$. Calculate the resolution of a 12-bit D/A converter. 5

3. a) What do you mean by Priority Resolving for handling multiple interrupts? Which PIC is best suited with 8086 microprocessor? And why? 10
   b) Define Aliasing problem and how to solve it? Write the meaning of the control word format of 8255A PPI when it is written as – 11010100. 10
   c) Draw the control word format for the 8255A PPI when Port-A is working in Mode-2 as an output port. 5

4. a) Briefly explain the peripheral controlled data transfer techniques. 10
   b) Write the basic differential features between 8155 and 8255 Programmable Peripheral Interface. 10
   c) Draw the timing diagram for Port A of 8255 PPI while it works in Mode 2. Consider that Port A can be used for both input and output purpose. 5

5. a) Describe DMA and its signals. Draw the diagram for logical pins and internal registers of the 8237 DMA controller. 10
   b) Differentiate between the *Synchronous*, *Asynchronous* and *Isochronous* transmissions. 10
   c) Draw the control word format for the 8255A PPI (*Consider that Port-A is in Mode-1 as an input port, Port-B is in Mode-0 as an output port and the lower-nibble of Port-C is working as an input and upper-nibble of Port-C is working as an output*). 5

6. 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
   b) How does CAN bus protocol encode the transmitted data? Write a short note on CAN bus characteristics and its logic states. 10
   c) List out the names of different frames of CAN bus protocol. 5

7. 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

b) Why does in I^2C bus the Start-End condition and Data-Transition signaling are opposite to each other? Explain. 10

c) Draw the frame format of I^2C bus and briefly explain it. 5

8. a) Write a short note on the Fiber-channel and Bluetooth interface. 10

b) Write a comparative study on – 10

i. Different versions of USB

ii. Different versions of Firewire

c) "In I^2C bus connections, *slave ICs* can only be receiver or receiver-transmitter" – Explain why. 5