

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

SEMESTER FINAL EXAMINATION

SUMMER SEMESTER, 2021-2022

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. Any Other Statements if necessary.

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1. a) What is an Embedded System? "In typical embedded system, computation requires higher energy cost than that of communication" – True or False? Justify your answer with appropriate example. 10
(CO1)
(PO1)
 - b) What are UART and USART? Why do we need 8251 UART/USART IC? 10
(CO2)
(PO2)
 - c) In order to connect two 7-Segment Displays with an 8086 Microprocessor system, how can you interface using a single 8255 PPI? Draw the interfacing diagram. 5
(CO4)
(PO4)

 2. a) What do you mean by priority resolving for handling multiple interrupts? Which PIC is best suited for 8086 microprocessor? Justify your answer. 10
(CO2)
(PO2)
 - b) How does 8259 PIC handle 64 Interrupt levels? Explain with necessary diagram. 10
(CO2)
(PO1)
 - c) Draw the control word format for the 8255A PPI when all the ports are connect to an 8x8 Dot-Matrix Display. 05
(CO4)
(PO4)

 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. 10
(CO2)
(PO2)
 - c) Suppose, in a serial system total 20 frames (each having a size of 5 bytes) need to be transmitted. In case of *asynchronous transmission*, 1 byte overhead occurs either for *start* or *stop* byte. In contrast, for *synchronous transmission*, 1 byte of synchronization overhead occurs after each 4 frame transmissions. Now, mathematically show the performance efficiency comparison between *Synchronous Transmission* and *Asynchronous Transmission*. 5
(CO2)
(PO2)

4. a) Write short notes on following frames of CAN bus:
- i. Overload frame
 - ii. Error frame
- b) What is the maximum length of a CAN bus? How can you justify that the maximum length of CAN bus is appropriate?
- c) Draw the block diagram of a basic CAN controller.
5. a) What do you mean by Wired-AND principle? How does it help for I²C bus?
- b) Why are the Start-End condition and the Data-Transition signaling opposite to each other in I²C bus? Explain.
- c) Draw the data formats of I²C protocol when the Master IC reads and writes to/from the Slave IC.
6. a) Differentiate between the features of USB (Universal Serial Bus) interface and Firewire Interface.
- b) How does the use of Bluetooth, WiFi and 3G/4G differ from each other in terms of designing wireless interfaces using IR and RF?
- c) "LoRaWAN makes an optimal use of power consumption and range" – Justify the statement with example.