

20

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

SEMESTER FINAL EXAMINATION
 DURATION: 3 HOURS

SUMMER SEMESTER, 2022-2023
 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. Figures in the right margin indicate full marks of questions with corresponding COs and POs in parentheses.

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|----|---|-------------------------|
| 1. | a) What is an Embedded System? How does it differ from typical Computer Systems? | 3 + 7 (CO1) (PO1) |
| | b) Draw the block-diagram of an embedded system considering a designer's view. Also, write down the customer functions for an embedded system. | 4 + 4 (CO2) (PO2) |
| | c) Draw an optimized block diagram of a PCB considering a set of peripherals with two-set 4-LEDs, two-set 7-Segment Displays and one-set 8 × 8 Dot-Matrix Display connected to a single CPU using multiple IC 8255 PPIs. | 7 (CO4) (PO3) |
| 2. | a) Explain the importance of a priority resolver IC. Differentiate between Daisy-Chain and Multi-level Bus architectures with proper explanation. | 3 + 7 (CO2) (PO2) |
| | b) Make the lists of the operating modes and operation command words of 8259 PIC. Using a block diagram, explain the functions of different registers of 8259 PIC. | 4 + 4 (CO2) (PO1) |
| | c) Derive all data bits for Port-A, Port-B and Port-C of IC 8255 considering the (4, 5) and (5, 4) LEDs selected with green colors in an 8 × 8 Dot-Matrix Display. You can assume any kind of logic bit (i.e., 0 or 1) for unique selections for port data. | 7 (CO4) (PO2) |
| 3. | a) Explain why Programmed I/O is not suitable for Disk RD/WR. Listing different applications for Disk RD/WR, explain a suitable solution in this regard. | 5 + 5 (CO2) (PO1) |
| | b) Using an appropriate block diagram, mention how the IC 8237 DMA Controller uses the system buses. | 8 (CO2) (PO1) |
| | c) Define UART and USART. Draw the interfacing structure of IC 8251. | 4 + 3 (CO2) (PO1) |
| 4. | a) Explain Wired-AND concept. CAN bus protocol removes a complete graphs connection complexity for an embedded system Justify the statement with proper explanation. | 3 + 7 (CO3) (PO1) |
| | b) Write short notes on following frames type of CAN bus: | 4 + 4 (CO3) (PO1) |
| | i. Remote frame | |
| | ii. Error frame | |

- c) Suppose, in a CAN bus protocol, four bytes of data (10101001, 11110000, 00111011, and 00010001) from one IC are consecutively transmitted to another IC. Considering the number of bits, $n = 8$ for Check-sum approach, show the operations for error-free data transfer between the ICs. 7
(CO3)
(PO3)
5. a) Explain by Arbitration in BUS protocols. "Multi-master concept exists for I²C bus" — verify the statement with proper explanation. 3 + 7
(CO3)
(PO1)
- b) Explain different types of acknowledgement and negative-acknowledgement transmissions in I²C bus with appropriate signal diagrams. 8
(CO3)
(PO1)
- c) Draw the data formats of I²C protocol when the Master IC reads and writes to/from Slave IC. 7
(CO3)
(PO3)
6. a) Define Jitter? Explain the concepts of Isochronous interfacing with appropriate examples. 3 + 7
(CO1)
(PO1)
- b) Write short notes on the following wireless interfacing concepts with their comparison table: 5 × 3
(CO3)
(PO1)
- i. IrDA
 - ii. Bluetooth
 - iii. IEEE 802.11
 - iv. IEEE 802.15.4
 - v. LoRaWAN