


Name:	
Enrolment No:	

UPES
End Semester Examination, May 2024

Program Name: B.Tech Automotive Design Engineering **Semester: IV**
Course Name: Microprocessor Based Control System **Time: 3 hrs**
Course Code: ECEG-2056 **Max. Marks: 100**
Nos. of page(s): 2
Instructions: Assume any data in the design, if required.

SECTION-A (5Q x 4M = 20 Marks)

S. No.		Marks	CO
Q.1	What is the different between microprocessor and microcontroller-based system.	4	CO1
Q.2	Detail the PSW status format of 8085 microprocessor and different flag status with examples.	4	CO2
Q.3	Design the logic diagram of address decoder multiplexer with complete detail of the truth table and Boolean equations.	4	CO1
Q.4	List the various types of instructions in 8085 microprocessors with examples.	4	CO2
Q.5	Interface the 8051 microcontrollers with 8 LEDs and write the program for blinking the LEDs in alternate fashion.	4	CO2

SECTION B (4Q x 10 M = 40 Marks)
Attempt all the questions.

Q.6	Comment on the need to addressing modes in microprocessor-based systems. Explain the different addressing modes of 8085 microprocessor with examples.	10	CO1												
Q.7	Comment on the priority of interrupts of 8085 microprocessor. Explain the arbitration scheme when multiple interrupts are assigned to microprocessor. Draw the interface diagram to support your answer.	10	CO3												
Q.8	Write an assembly program for 8085 to find the largest number in an array. Table 1 Data array <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Memory Address</th> <th>Data</th> </tr> </thead> <tbody> <tr> <td>2500 H</td> <td>06 H</td> </tr> <tr> <td>2501 H</td> <td>38 H</td> </tr> <tr> <td>2502 H</td> <td>94 H</td> </tr> <tr> <td>2503 H</td> <td>EB H</td> </tr> <tr> <td>2504 H</td> <td>A8 H</td> </tr> </tbody> </table>	Memory Address	Data	2500 H	06 H	2501 H	38 H	2502 H	94 H	2503 H	EB H	2504 H	A8 H	10	CO2
Memory Address	Data														
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Q.9	Discuss the criteria for selecting the microcontroller for automotive embedded systems. Take an example of ECU interface with the control unit of a car and show the control strategy required for anti-lock braking systems (ABS) and traction control systems (TCS), helping to maintain control during braking and acceleration.	10	CO4
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OR

Explain the multiplexing and demultiplexing is microprocessor-based control system.

SECTION-C (2Q x 2M = 40 Marks)

Attempt any two of the followings

Q.10

(a) Detail the functional block diagram of 8085 microprocessor with the complete functionality of individual block
 (b) Calculate the time required to execute the instruction STA 9000 H, if the XTAL frequency is 3 MHz, also explain its timing diagram with the following data shown in Table 2.

10+10

CO2

Table 2 STA instruction

Address	Mnemonics	Opcode
800F	STA 9000 H	32
8010		00
8011		90

Q.11

(a) Detail the pin layout of 8085 microprocessor with the complete functionality of individual pin.
 (b) Draw the block diagram of different types of control systems, Discuss the different functional blocks of power window control.

10+10

CO3

Q.12

You are dealing with a simple system that can control 100 cars at the maximum. Each time a car enters, the microcontroller automatically adds it to the total sum of other cars found in the garage. Each car that comes out will automatically be taken off. When 100 cars park, a signal will turn on signaling that a garage is full and notifying other drivers not to enter because there is no space available.

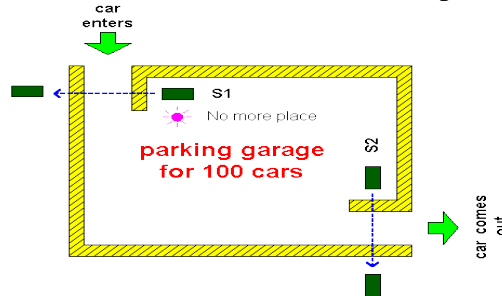


Fig. 1

Signal from a sensor at the garage entrance sets bit IR200.00. This bit is a condition for execution of the following two instructions in a program. The first instruction resets carry bit CY (it is always done before some other calculation that would influence it), and the other instruction adds one to several cars in word HR00, and a sum is again stored in HR00. HR memory space is selected for storing a total number of cars because this keeps the status even after supply stops.

Develop a code to display the information of car parking on LCD (16 x 2). Use any microprocessor or microcontroller reference to develop the program!

- (i) **FULL PARKING**
- (ii) **VACANT PARKING**

20

CO4