Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala
Computer Science & Engineering Department
AUXILIARY END SEMESTER EXAMINATION (FEB 2023)

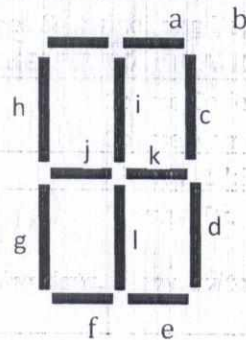|	
B.E. (IV Year): Semester-VII	Course Code: UCS704
	Course Name: Embedded Systems Design
February 24, 2023	Friday, 17:30 – 20:30 PM
Time: 3 Hours, M. Marks: 40	Faculty: Dr. Ranjeet K. Ranjan

Note: Attempt all questions. Assume missing data, if any, suitably.

1(a) LED display is a popular choice to show alphanumeric information in many embedded system applications. Twelve segments LED is one such display device which uses 12 LEDs to represent various alphabet and numbers as shown in Fig.1. Assume the common cathode connection to connect all 12 LEDs, "a" as the LSB bit, "l" as MSB bit and refer remaining bits in alphabetic order. Find the 12 segment codes (in binary) to display the following characters.
(4)

Fig.1: 12-segment LED display

i)   W (capital)
ii)   h (small)
iii)   P (capital)
iv)   c (small)

1(b) Explain the Organic LED (OLED) and its advantages. Why OLED is considered as a better display device compared to other standard display types.   **(4)**

2(a) Draw the pin-diagram of 8051 Microcontroller and explain the functionality of the Port0 (P0.0 to P0.7) and Port2(P2.0 to P2.7).   **(4)**

2(b) What is the use of H-bridge in a motor? Draw a circuit diagram of H-bridge and explain its working briefly.   **(4)**

3(a) What is Binary Coded Decimal (BCD)? How packed BCD are different from unpacked BCD? For 984 and 599, find BCD addition. **(4)**

3(b) Explain the Application Specific Integrated Circuit (ASIC) and draw the complete ASIC design flow sequence. **(4)**

4. Considering the given process table (Table 1).

Table 1

Process	CPU Burst Time	Period
P1	4	15
P2	2	12
P3	5	20

(a) Write the necessary condition for RMA (Rate Monotonic Algorithm). Justify your answer with the above values mentioned in the Table. **(3)**

(b) Draw the figure (GANTT CHART) with processes illustrating the execution of these processes with RMA on both: separate time axis and same time axis. **(5)**

5(a) Discuss the different components used in IoT and the challenges or risks associated with IoT. List any five real-world applications of IOT. **(4)**

5(b) Explain the phases of the Design and Development of an Embedded Product. Why is EDLC management considered to be important? **(4)**