Roll Number:

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Note: Attempt all questions serially. All parts of a question must be answered at one place. Assume any missing data.

		CO	BL

Q.1 (a) Explain the working of the following pins of 8051 microcontrollers: **(4) CO3 L1**

   i. $\overline{PSEN}$

   ii. $\overline{EA}$

   iii. RXD

   iv. RST

(b)

   i.   Convert the binary number: $(11011101100.0101)_2$= (?) $_{BCD}$ **(4) CO1 L2**

   ii. Perform BCD subtraction using 10's compliment method :$(26.25)_{10}$ - $(38.26)_{10}$

Q.2 (a) Draw the circuit diagram and explain the working of Power-on Reset and Brown-out Reset used in embedded systems. **(4) CO3 L1**

(b) A 32 - bit wide main memory unit with a capacity of 1 GB is built using 256M X 4-bit DRAM chips. The number of rows of memory cells in the DRAM chip is 2^{14}. The time taken to perform one refresh operation is 50 nanoseconds. The refresh period is 2 milliseconds. Find the percentage (rounded to the closest integer) of the time available for performing the memory read/write operations in the main memory unit. **(3) CO3 L2**

Q.3 (a) Give one primary advantage of invasive signal reading technique over Non-invasive technique in Brain Machine Interface (BMI). Is it possible to use **(2) CO1 L4**

human organ as end device in BMI? Justify your answer with help of an example.

(b) LED is used as display in many embedded systems. Sixteen segments LED is an alphanumeric popular display which uses 16 LEDs to represent various alphabet and numbers as shown in fig.1. Assume "a1" as the LSB bit, "m" as MSB bit and refer remaining bits in order. **(6) CO1 L3**
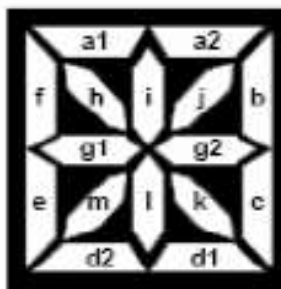

Fig.1 : 16-Segment LED display

Display the following characters on the 16-segment LED display and also provide the sixteen bit binary code used to display the characters using common anode connection:

 i.   V (capital)
 ii. f (small)
 iii. 4

Q.4 Describe Light Detecting Register (LDR) sensor. Using LDR, draw a circuit for light activated switch and explain its working. **(3) CO3 L1**
(a)
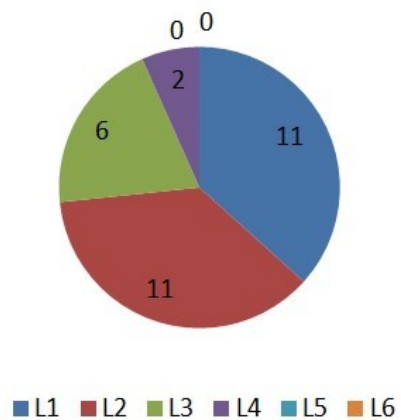
(b) Explain following with diagram: **(4) CO3 L2**
 i.   H-Bridge
 ii. High Impedance state or Hi-Z state

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Bloom's Level wise Marks Distribution

Course Outcome wise Marks Distribution