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(2021CSB043)

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B. Tech. (CST) 5th Semester Mid-Term Examination, September, 2023

Microprocessor Based Systems (CS 3101)

Full Marks: 100 (Final Weightage 30)

Time: 2 Hours

- Attempt all four (4) questions.
- Answers should be precise, to the point, and in your own words as far as practicable.
- If not explicitly mentioned, assume Intel 8085A as the base microprocessor.
- Make your own assumptions, if necessary, and state them at proper places.

1. Say, the **memory space** for an Intel 8085A microprocessor has to be populated with one fixed 128Kb (that is, $16K \times 8 = 16KB$) ROM (say, IC 27128), one fixed 256Kb (that is, $32K \times 8 = 32KB$) RAM (say, IC 62256) and one **configurable** slot where **either** one 32Kb (that is, 4KB. Say, IC 2732) **or** one 64Kb (that is, 8KB. Say, IC 2764). With a suitable diagram, propose and explain how to achieve this. [25]

2. (a) Write an assembly language subroutine "**unsigned int isEven(unsigned int n)**" that returns **true** (that is, 1) if **n** is even. Otherwise the function returns **false** (that is, 0).
- (b) Write an Intel 8085 assembly language program that, in an **infinite** loop, **reads** from the SID pin and **produces** its complement at SOD pin. That is, if the program reads a 0 (or an 1) from SID, then it produces an 1 (or a 0).
- (c) Write an assembly language subroutine which is functionally similar to the following C language function.

```
void swap(int *p1, int *p2){  
    int t;  
    t = *p1;  
    *p1 = *p2;  
    *p2 = t;  
}
```

Please note that the parameters to the subroutine are pointers (memory addresses). Demonstrate how the subroutine can be called with required parameters.

[5+10+10]

3. Say, a keypad having 64 keys (organized as a 8×8 matrix) has to interfaced with Intel 8085A microprocessor using the 8-bit ports **A** and **B** of an 8255 PPI. Propose a suitable design for the system. Draw a schematic diagram along with explanation to propose your design. Write a suitable assembly language subroutine "**RDKBD**" that *waits* until a key is pressed, when it returns the row and column positions of the pressed key through registers B and C, respectively. [25]

4. Write short notes on the following.

- (a) IO mapped IO for Intel 8085A microprocessor.
- (b) Memory Folding
- (c) Software versus Hardware Interrupts for Intel 8085A microprocessor

[7+9+9]

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