**Department of Computer Science and Engineering**

**MIDTERM EXAMINATION**

**SUMMER 2023**

**CSE 340: Computer Architecture**

**Total Marks: 25 Time Allowed: ?? Hours**

* **Answer ALL the questions**
* **At the end of the exam return both your answer script along with your question**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section: \_\_\_\_\_\_

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| --- | --- | --- | --- | --- |
| 1. | CO1 | a. | Define a multiprocessing system with diagram | **3** |
|  | b. | Explain the power trend equation. | **3** |
|  |  | c. | 1. If an operation needs 150 seconds in total and among that 15% is serial operation. If you want to improve the performance by 3.75 times, what improvement you need to include in your system. 2. Draw the diagram of the von Neumann architecture. | **3+2** |
| 2. | CO2 | a. | In 32-bit MIPS architecture how many R-type instructions are possible. | **2** |
|  | b. | Design a register file having 256 registers and each register can hold 128-bit of data. Make sure that your bit lengths in each input and output links show the correction configuration. | **3** |
|  |  | c. | If base address of an array A is 0x00001234, then calculate the starting address of array A [24]. | **2** |
|  |  | d. | Write MIPS code from the following code sequence. Consider base address of A is in $s0 and X and Y are in registers $s1 and S2 respectively. Make sure you make optimum utilizations of the registers.  A [7] =13\*X+4\*A [5] +11\*Y-100; | **3** |
| e. | Consider the conditional branch instruction **Bne $10, $11, 100**. Assume program counter value is 0x00002222.Calculate the branch target address. Your answer should show all the steps in detain will necessary diagram. | **4** |