

Department of Computer Science and Engineering

UIET, CSJM University, Kanpur

Computer Organization (CSE-S205)

B.Tech. (CSE)

Semester: 2023 -24 (Even Semester)

Year: IInd Year/ IVth Semester

Mid Semester -I

Time: 1.5 H

Maximum Marks: 30

All Questions are compulsory

Section A

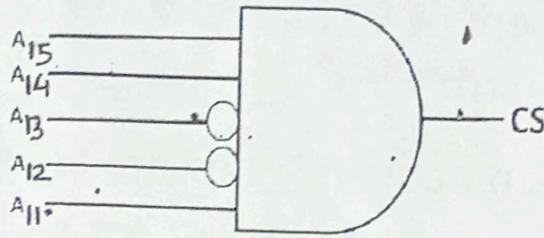
(1 Mark each)

1. A processor can support a maximum memory of 4GB, where the memory is word-addressable (a word consists of two bytes). How many address lines are required to access the memory?
2. How many bits can be stored in a 1GB memory?
3. Assume that for a certain processor, a read request takes 50 nanoseconds on a cache miss and 5 nanoseconds on a cache hit. Suppose while running a program, it was observed that 80% of the processor's read requests result in a cache hit. Find average read access time of system in nanoseconds.
4. Write key characteristics of semiconductor memories.
5. How magnetic memory is different from optical memories?
6. Explain accessing of Direct Accessing Memories.
7. What is the difference between sequential accessing and random accessing? Explain with example.
8. What do you mean by locality reference? How this concept is helpful in cache designing?
9. What are the main advantage and disadvantages of virtual memory?

Section B

(3 Mark each)

10. The chip select logic for a certain DRAM chip in a memory system design is shown on next page. Assume that the memory system has 16 address lines denoted by A_{15} to A_0 . What is the range of addresses (in hexadecimal) of the memory system that can get enabled by the chip select (CS) signal?



11. Let virtual memory concept is implemented in a computer in which secondary memory can accommodate 1G words and RAM can accommodate 1 M words, block and page size is 1K words. Find the size of page table if page table is stored in i) RAM ii) Associative Memory.
12. Implement circuit of shared bus of a system that has four storage units of size eight bits, all four storage units support parallel in parallel out communication.

Section C
(6 Mark each)

13. Explain working of Associative memory with a suitable example and write Boolean expression of match logic (M_i) for i^{th} register of associative memory.
14. What do you mean by cache mapping? Discuss different mapping techniques with their advantages and disadvantages.

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B.Tech. (CSE & CSE-AI)

Semester: 2023 -24 (Even Semester)

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Mid Semester -II

Time: 1.5 H

Maximum Marks: 30

All Questions are compulsory

Section A

(1 Mark each)

1. Specify size of address bus and data bus needed in computer1 to transfer data among different units.
2. What will be the appropriate size of sequence-counter (SC) register in computer1? Why?
3. List out all input and output instructions with its hex code.
4. What is control(s) to execute register reference instructions in computer1?
5. Write control with time to fetch, decode and execute BSA instruction of computer1.
6. What do you mean by interrupt cycle? Write micro-operations of interrupt cycle with its controls.
7. What is the need of FGI and FGO flags in computer1.
8. What do you mean by addressing mode? Discuss different addressing modes used in computer1.
9. How assembly language programs are different machine language programs? Explain with an example.

Section B

(3 Mark each)

10. Find controls for LD, CLR and INR of DR register in computer1.
11. Find control for LD, CLR and INR of AC register in computer1.
12. Design circuit to set reset E flip flop in computer1.

Section C

(6 Mark each)

13. Write assembly language program for computer1 to perform logical OR operation between content of memory location 200 and content of memory location 300.
14. Show the content of all registers of computer1 during the execution of above program, initially assume all registers are reset.

Department of Computer Science and Engineering

University Institute of Engineering and Technology, CSJM University, Kanpur

Computer Organization (CSE-S205)

B.Tech (CSE)

Semester: IVth

Year: 2nd

End Semester Examination

Time: 3 Hour

M.M.: 50

All Questions are compulsory

Section A

Note: In this section, each question carries 1 mark. (1X10)

1. How many bits can be stored in a 4GB memory?
2. State locality reference concept used in cache memory.
3. Why address bus is unidirectional and data bus is bidirectional?
4. What are the main advantages and disadvantages of virtual memory?
5. Is cache memory is an essential component of a digital computer? Why?
6. List out all flags used in computer-1 and computer-2 with their uses.
7. What do you mean by micro-instruction? Gives its format for computer-2.
8. What is need of addressing mode in computer instructions?
9. What do you mean by control transfer instructions? List out all control transfer instructions of computer-1 and computer-2.
10. Mention main advantage of micro-programmed computer over hardwired computer.

Section B

Note: In this section, each question carries 4 marks. (4X5)

11. Find Boolean expressions of S2, S1 and S0 which is used to select source register in shared bus system of computer-1.
12. Draw circuit of sequence selector of computer-2 which is used to compute correct value of CAR register.
13. Write micro-subroutine for branch instruction in computer-2 in machine language.
14. Write an assembly language program for computer-1 to perform logical OR operation between content of memory location $(300)_{16}$ and memory location $(301)_{16}$. Show content of all registers in different clock period during execution of your program.
15. Let assume, we added ISZ instruction in computer-2. Write symbolic micro-subroutine for newly added instruction ISZ. Note that DR=0 status condition is not available in CD field in computer-2. However, you can exchange AC and DR and check if AC=0 with the Z bit.

Section C

Note: In this section, each question carries 10 marks. (2X10)

16. What do you mean by ALU? Implement circuit of 1 bit ALU of computer-1 with all controls of AC. How 1 bit ALU can be used to implement full fledged ALU of computer-1?
17. How ALU of computer-2 is different from ALU of computer-1? Implement circuit of 1 bit ALU of computer-2 with all controls of AC.