QUESTION BANK

SUBJECT CODE: CS1358 **YEAR : III**
SUBJECT NAME: COMPUTER ARCHITECTURE **SEM : VI**

UNIT-1- BASIC STRUCTURE OF COMPUTERS

PART- A (2 marks)

1. Define interrupt and ISR.
2. Define Bus. What are the different buses in a CPU?
3. Compare single bus structure and multiple bus structure?
4. What is System Software? Give an example?
5. What is Application Software?
6. What is multiprogramming or multitasking?
7. Define clock rate.
8. Write down the basic performance equation?
9. What is big endian and little endian format?
10. What are condition code flags?
11. What are the commonly used condition code flags?
12. Define addressing mode.
13. What the various addressing modes?
14. Define device interface.
15. What are the various units in the computer?
16. What is an I/O channel?
17. What is a bus?
18. Define word length.
19. Explain the following the address instruction?
20. What is the straight-line sequencing?
21. What is stack?
22. What is a Queue?

PART-B(16 Marks)

1. Explain the various generations of Computer (16)
2. Explain the basic functional units of a simple computer. (16)
3. Describe the different classes of instructions format with example. (16)
4. Explain various addressing modes found in modern processors (16)
5. What are stack and queues? Explain its use and give its differences (16)
6. Write short notes on software performance and Memory locations and address .(16)

UNIT-2-ARITHMETIC

PART- A (2 marks)

1. Give an example each of zero- address, one-address, two-address and three-address instructions.
2. What is booth algorithm?
3. Write down the steps for restoring division and non-restoring division.
4. What is the advantage of non restoring over restoring division?
5. Briefly explain the floating point representation with an example?
6. What are guard bits?
7. What are the ways to truncate guard bits?
8. What are the two attractive features of Booth algorithm?
9. What are the two techniques for speeding up the multiplication operation?
10. How bit pair recoding of multiplier speeds up the multiplication process?

PART-B(16 Marks)

1. (a) Discuss the principle of operation of carry-look ahead adders. (08)
   (b) Discuss the non-restoring division algorithm. Simulate the same for 23/5. (08)
2. (a) Multiply the following pair of signed 2's complements numbers using bit pair recoded multiplier: Multiplicand = 110011 Multiplier = 101100. (08)
   (b) Describe the algorithm for integer division with suitable example. (08)
3. Describe how the floating-point numbers are represented and used in digital arithmetic operations. Give an example. (16)
4. (a) Explain the representations of floating point numbers in detail. (06)
   (b) Give the block diagram of the hardware implementation of addition and subtraction of signed number and explain its operations. (10)
5. (a) Design a multiplier that multiplies two 4-bit numbers. (06)
   (b) Explain the working of floating point adder and subtractor. (10)

UNIT-3-BASIC PROCESSING UNIT

PART- A (2 marks)

1. Name two special purpose registers.
2. Define datapath.
3. Define processor clock.
4. Define register file.
5. What are the two approaches used for generating the control signals in proper sequence?
6. What are the factors determine the control signals?
7. What are the features of the hardwired control.
8. What is micro programmed control?
9. What is control word?
10. Define micro routine and microinstruction.
11. Name some register output control signals.
12. What is vertical organization and horizontal organization?
13. Compare vertical organization and horizontal organization.
14. What is the drawback of micro programmed control?
15. Name the four steps in pipelining.
16. What is data hazard?
17. What are instruction hazards?
18. What are called stalls?
19. What is structural hazard?
20. What is said to be side effect?
21. What is branch folding?
22. Define speculative execution.
23. What is called static and dynamic branch prediction?

PART-B(16 Marks)

1. Give the organization of typical hardwired control unit and explain the functions performed by the various blocks. (16)
2. Discuss the various hazards that might arise in a pipeline. What are the remedies commonly adopted to overcome/minimize these hazards. (16)
3. Explain in detail about instruction execution characteristics. (16)
4. With a neat block diagram, explain in detail about micro programmed control unit and explain its operations. (16)
5. (a) Explain the execution of an instruction with diagram. (08)
   (b) Explain the multiple bus organization in detail. (08)
6. (a) Explain the function of a six segment pipeline showing the time it takes to process eight tasks. (10)
   (b) Highlight the solutions of instruction hazards. (06)

UNIT-4-MEMORY SYSTEM

PART- A (2 marks)

1. Define memory access time.
2. Define memory cycle time.
3. What is MMU?
4. Define static memories.
5. What are the Characteristics of semiconductor RAM memories?
6. What are the Characteristics of SRAMs?
7. What are the Characteristics of DRAMs?
8. Define Memory Latency.
9. What are asynchronous DRAMs?
10. What are synchronous DRAMs?
11. What is double data rate SDRAMs?
12. What are SIMMs and DIMMs?
13. What is memory Controller?
14. Differentiate static RAM and dynamic RAM.
15. What are RDRAMs?
16. What are the special features of Direct RDRAMs?
17. What are RIMMs?
18. Define ROM.

PART-B(16 Marks)

1. (a) Discuss the various mapping techniques used in cache memories. (08)

   (b) A computer system has a main memory consisting of 16 M words. It also has a 32K word cache organized in the block-set-associative manner, with 4 blocks per set and 128 words per block. Calculate the number of bits in each of the TAG, SET and WORD fields of the main memory address format. How will the main memory address look like for a fully associative mapped cache? (08)

2. (a) Explain the concept of virtual memory with any one virtual memory management technique.(08)

   (b) Give the basic cell of an associative memory and explain its operation. Show how associative memories can be constructed using this basic cell. (08)

3. Give the structure of semiconductor RAM memories. Explain the read and write operations in detail. (16)

4. Explain the organization of magnetic disks in detail. (16)

5. (a) A digital computer has a memory unit of 64K*16 and a cache memory of 1K words. The cache uses direct mapping with a block size of four words. How many bits are there in the tag, index, block and word fields of the address format? How many blocks can the caches accommodate? (16)

UNIT-5-I/O ORGANIZATION

PART- A (2 marks)

1. What is program controlled I/O?
2. What are the various mechanisms for implementing I/O operations?
3. What are vectored interrupts?
4. When the privilege exception arises?
5. What is time slicing?
6. What is memory mapped I/O?
7. What is DMA?
8. What is DMA controller?
9. What is cycle stealing?
10. What is bus arbitration?
11. What are the three types of buses?
12. What are the objectives of USB?
13. What is synchronous bus?
14. What is asynchronous bus?
15. What are the functions of typical I/O interface?

PART-B(16 Marks)

1. Explain the functions to be performed by a typical I/O interface with a typical input output interface. (16)
2. (a) Discuss the DMA driven data transfer technique. (08)

   (b) Discuss the operation of any two input devices (08)
3. Explain in detail about interrupt handling. (16)
4. Explain in detail about standard I/O interface. (16)
5. Describe the functions of SCSI with a neat diagram. (16)
6. (a) What is the importance of I/O interface? Compare the features of SCSI and PCI interfaces. (08)

(b) Explain the use of vectored interrupts in processes. Why is priority handling desired in Interrupt controllers? How does the different priority scheme work? (08)

7. Write notes on the following. (16)