

Third Year Supplementary Examination - 2007**COMPUTER ARCHITECTURE AND ORGANIZATION -1****Full Marks – 70****Time 3 Hours****Answer Question No. 1 which is compulsory and any five from the rest'***The figures in the right-hand margin indicate marks.*

1. Answer the following questions: [2 x 10]
- A processor has a 64 bits word size and 32 bit main memory address. What is size of the address generated by the processor.
 - In 8085 microprocessor when an auxiliary carry is generated.
 - What is the difference between access time and bandwidth of a memory.
 - What is a page fault.
 - What is difference between dirty bit and valid bit.
 - Define microinstruction.
 - Show the structure of a DRAM cell.
 - Differentiate between system software and application software.
 - Illustrate the address mechanism of a word addressable computer.
2. (a) Give a short sequence of machine instructions for the task; “Add the contents of memory location A to those of location B, and place the answer in location C”. Instructions Load LOC, Ri and Store Ri, LOC are the only instructions available to transfer data between the memory LOC and general processor register Ri. The contents of the memory location A and B should not get destroyed. 5]
- (b) Write a program that can evaluate the expression $A*B + C*D$ in machine that supports Zero addressed instruction format. [5]
3. (a) Illustrate with an example the mapping technique in a direct mapped cache. [5]
- (b) Design a 4096 x 16 memory using 128 x 8 memory chips. [5]

4. (a) What is difference between horizontal microinstruction and vertical microinstruction.

[5]

(b) suppose eight control signal a,b,c,d,e,f,g and h are to be stored using both horizontal and vertical microinstruction format. Specify the number of control bits required in each format.

[5]

5. (a) Express the number- 1.5 in IEEE 32-bit floating format.

[5]

(b) Find the bias value for a base-2 exponent in a 6-bit exponent field.

[5]

6. (a) Explain Big-Endian and Little-Endian addressing with an example.

[5]

(b) Perform the multiplication of two number 12 and -6 using Booths multiplication technique.

[5]

7. (a) Write a assembly language program in 8085 to sort an array of N numbers. [5]

(b) Write a program to add five bytes of data stored in memory location starting from 4000H.

[5]

8. A byte-addressable computer has a small data cache capable of holding eight 32 bit words.

Each cache block consists of one 32 bit word. When a given program is executed the processor reads data from the following sequence of hex addresses: “200,204,208, 20C, 2F4, 2F0, 200, 204, 218, 21C, 24C, 2F4”. This pattern is repeated four times. Show the contents of the cache at the end of each pass through this loop if a direct mapped cache used. Compute the hit rate for this example. Assume that the cache is initially empty.

[10]