B.Sc. (Honours) Examination 2018
Semester-IV
Computer Science
Course : BCSC-42
(Computer Architecture)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Answer Question No. **1** and **any four** from the rest

1. Answer **any eight** of the following : 1×8=8
   i) What do you mean by Programme Status Word (PSW)?
   ii) What is ALE?
   iii) What is the function of Programme Counter (PC)?
   iv) What is the purpose of MBR?
   v) How many instructions are there in Intel 8085?
   vi) How many address lines are required to address 1T(tera) locations?
   vii) What do you mean by memory cycle time?
   viii) Write down the characteristic of Random Access Memory (RAM)?
   ix) Which bus is bidirectional?
   x) What are the various flags in Intel 8085?
2. a) What does a RST (Restart Instruction) do?
   b) What are various hardware and software restarts in Intel 8085. Distinguish between hardware and software restarts. What do you mean by vector call and vector locations in context of RST?
   c) Write down the following interrupts according to their increasing priority : TRAP, INTR, RST 6.5, RST 5.5 and RST 7.5. 1+(2+2+2)+1=8
3. a) What do you mean by property of Locality of Reference? Explain the performance of cache in terms of hit and miss ratio.
   b) What are primary and secondary caches? What are the purposes of data and instruction caches? Define hit rate and miss penalty in a cache.
   c) Let h be the hit rate, M be the miss penalty and C be the time to access information in the cache. Write down the mathematical expression for average access time experienced by the CPU. Explain the meaning of the terms of the expression. 1+1+1+1+1+2+1=8
4. a) What do you understand by Addressing Modes of a microprocessor? What are the various addressing modes supported by Intel 8085. Compare and contrast Register Direct and Register Indirect Addressing Modes with examples. Explain Implicit Addressing with example.
   b) What are single-byte, two-byte and three-byte instructions? Explain with examples. 1+2+4+1=8

P.T.O.

5. What do you mean by Data Stream(DS) and Instruction Stream(IS)? What is Flynn's classification of computer Architecture? Describe each of them with a schematic diagram. How does a Shared Memory SIMD computer function? 1+1+4+2=8

6. a) What do you understand by virtual memory? Define virtual address and logical address. What do you mean by memory space and address space?

   b) Suppose a computer system has 8K Address Space and 4K memory space. What are widths of virtual address and physical address? Explain with the help of memory page table how the virtual address is translated to physical main memory address. Consider suitable block and page size)

   c) What do you understand by page fault? When do page faults occur? Compare page replacement algorithms FIFO and LRU. (1+0.5+0.5)+(1+2)+3=8

7. a) Explain the operations of following instructions:

   ADD B,
   MVI A, 17H
   STA 5600H
   MOV A,B

   b) Explain why the memory cycle time is longer than memory access time? What is memory interleaving? Explain why the aggregate rate of transmission of words to and from the main memory get increased with the introduction of memory interleaving. 4+(1+1+2)

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