CS-64

BACHELOR IN COMPUTER APPLICATIONS

Term-End Examination

December, 2007

CS-64 : INTRODUCTION TO COMPUTER ORGANISATION

Time : 3 hours *Maximum Marks : 75*

Note : *Question number 1 is* ***compulsory****. Answer any* ***three*** *questions from the rest.*

1. (a) Perform the following arithmetic operations using 8-bit registers. Use 2's complement method. Indicate overflow/underflow, if any. 6

(i) – 72 – 54

(ii) – 63 + 64

(iii) 62 – (– 64)

(iv) 73 + 64

(b) Write an assembly program to reverse a string stored in Data segment. The reversed string should be stored at same location where the original string was stored. 5

(c) What is the need of micro-programmed control unit in a computer ? How is a micro-program executed ? 4

(d) What is the need of master-slave flip-flop ? Draw the logic diagram of JK master-slave flip-flop and explain its functioning. 5

(e) Explain the interrupt driven Input/Output. Compare the operation with DMA. 5

(f) Explain the use of 'IDIV' and 'AAS' instructions with the help of an example of each for 8086 micro-processor. 5

2. (a) Using 4×1 multiplexers and full adders, construct a 4-bit arithmetic circuit. With the help of suitable tables, explain how this circuit will perform different arithmetical operations. 6

(b) Why is memory interleaving used ? Discuss 4-way interleaved memory architecture. 5

(c) Explain the $2\frac{1}{2}$D chip organisation. How does it differ from the 2D organisation ? 4

3. (a) What is the concept of segmentation in the context of 8086 micro-processor ? How is a 16-bit address mapped to 20-bit physical address ? 5

(b) "ROM is a permanent memory but it is a combinational circuit." Justify this statement by giving example of 2 word-4 bit ROM. How is a cell of ROM different from that of RAM ? 5

(c) What is an arithmetic processor ? Compare the co-processor with peripheral processors. 5

4. (a) List the types of instructions. What are the factors that play an important role for selection of instruction set for a machine ? 5

(b) Why does DMA have priority over the CPU when both request a memory transfer ? 3

(c) Make the logic diagram of a 4-bit serial shift register using J-K flip-flops. Show the steps to shift the binary number 1001, through this shift register. 7

5. (a) Explain four differences between vertical and horizontal micro-instruction formats. 4

(b) Draw selector and multiplexer I/O channels. Also explain in which situations each would be applied. 4

(c) If a memory read cycle takes 50 ns and a cache read cycle takes 10 ns, then (using this data) can you prove that the performance with cache is better ? Make suitable assumptions about hit ratio. 2

(d) Write a program for evaluating $A + B \times C - D/E$ using 2 and 3 address machine instructions. 5