Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. 0502EC101010

EC–302(GS)

B. E. (Third Semester) EXAMINATION, Dec., 2011

(Grading System)

(Electronics & Communication Engg. Branch)

COMPUTER SYSTEM ORGANIZATION

[EC–302(GS)]

Time : Three Hours

Maximum Marks : 70

Minimum Pass Marks : 22 (Grade–D)

Note : Attempt *one* question from each Unit. All questions carry equal marks.

Unit–I

1. (a) The following program is stored in the memory unit of the basic computer. Show the contents of the AC, PC and IR (in hexadecimal), at the end, after each instruction is executed. All numbers listed below are in hexadecimal :

Location	Instruction
010	CLA
011	ADD 016
012	BUN 014
013	HLT
014	AND 017
015	BUN 013
016	C1A5
017	93C6

P. T. O.

(b) How are the effective addresses computed when the instructions are :

(i) Immediate

(ii) Direct

(iii) Indirect

Or

2. (a) Design a hardware circuit by using common bus architecture to implement the following Register Transfer Languages :

P $A_1 \leftarrow A_2$

Q $A_2 \leftarrow A_3$

R $A_4 \leftarrow A_1$

S $A_3 \leftarrow A_4, A_1 \leftarrow A_4$

where A_1, A_2, A_3, A_4 are one-bit register.

(b) The value of two 8-bit numbers A and B is 11001100 and 00111001 respectively. Determine the contents of the flag register of the 8085 microprocessor after the subtraction of A and B is performed.

Unit–II

3. (a) Draw a detailed flowchart of the instruction cycle. Indicate the conditions in which register-reference/memory-reference and input-output instructions are executed. Also include the interrupt cycle micro-operations in the flowchart.

(b) Multiply $(-7)_{10}$ with $(3)_{10}$ by using Booth's multiplication. Give the flow table of the multiplication.

Or

4. (a) What is meant by Normalization ? Why do we do normalization of floating point numbers ?

   (b) Explain the following :

   (i) Program Sequencer

   (ii) Hard Wired Control

Unit – III

5. (a) Write a program using assembly language of 8085 microprocessor to check whether a given number is odd or even. If the given number is even then display '1' on its SOD line. Give the flowchart also.

   (b) Differentiate between the following :

   (i) Isolated I/O and Memory-Mapped I/O

   (ii) Source Initiated and destination initiated transfer using handshaking.

Or

6. (a) What are the different modes of Data Transfer ? Explain the DMA controller with a block diagram. What is meant by block transfer ?

   (b) Write a note on I/O processor.

Unit – IV

7. (a) State how different policies of writing into cache are implemented.

   (b) Given the cache access time as 10 ns memory access time as 100 ns and cache hit rate as 90%, calculate the effective memory access time.

Or

8. (a) A personal computer has main memory of bytes and cache memory of 512 words. The cache is directly mapped with block size of 4 words :

   (i) How many bits are required in tag, index block and word fields of the address format ?

(ii) Show the addressing format.

(iii) What are the advantages of direct addressing scheme ?

(b) Explain the concept of associative memory.

Unit – V

9. (a) A non-pipeline system takes 50 ns to process a task. The same task can be processed in a six-segment pipeline with a clock cycle of 10 ns. Determine the speedup and the efficiency of the pipeline for 100 tasks. What is the maximum speedup and efficiency that can be achieved ?

(b) What are the different conflicts that will arise in pipeline ? How do you remove the conflicts ?

Or

10. Write notes on the following :

(a) Vector processing

(b) Array processor