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Code No. : 13207CA O3

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CSE) II Year I-Semester Old Examinations, May/June-2018

Computer Architecture

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Perform the arithmetic operations (+42) + (-13) in binary using signed 2's complement representation for negative number.
2. How would you detect an overflow condition in arithmetic operation?
3. Find out the size of multiplexer and number of multiplexers is required to access data on 8 registers each of 16 bits?
4. What are various phases of instruction cycle?
5. How the computer checks for stack overflow or stack underflow?
6. Which operation can be performed if multiplier Q_n and Q_{n+1} contains '0' and '1' at most significant bit in booth multiplication?
7. How the CPU specifies whether the address on the address line is for a memory word or I/O interface of memory mapped I/O?
8. List out the various types of peripheral devices.
9. What is locality of reference in cache memory?
10. How the magnetic tape work?

Part-B (5 × 10 = 50 Marks)

11. a) What is interconnection structure of a computer? Brief about data transfer. [4]
b) Convert decimal number '5' into binary code, excess-3 code and grey code? [6]
12. a) List out the various types of registers are used in common bus structure. Design basic computer registers connected to a common bus? [5]
b) What would happen if arithmetic shift right and arithmetic shift left apply on binary number 1000? [5]
13. a) Explain micro-instruction code format with suitable control memory. [5]
b) Apply BCD adder on expression 1001 + 0111 and design block diagram. [5]
14. a) Draw the block diagram and explain how data is transferred with the help of DMA. [4]
b) A DMA controller transfers 16-bit word to memory using cycle stealing. The words assembled from a device that transmits characters at a rate of 2400 characters per second. The CPU is fetching and executing instructions at an average rate of 1 million instructions per second. By how much will the CPU be slow down because of DMA transfer when the characters are represented with 8 bit ASCII? [6]

15. a) Explain the performance of CPU and its factors. [4]
- b) An address space is specified by 24 bits and the corresponding memory space by 16 bits. [6]
- How many words are there in address space?
 - How many words are there in memory space?
 - If a page consists of 2k words, how many pages and blocks are there in the system?
16. a) What do you mean by interrupt cycle? How the interrupt is handled by the computer? [5]
- b) What is r's complement? Find out the 10's complement of 2389 and 2's complement of 101100? [5]
17. Answer any **two** of the following:
- Explain about associative memory. [5]
 - What is pipelining? Discuss the operation of pipeline organization with an example? [5]
 - What is the use of auxiliary memory? Design and explain the operation of magnetic disk? [5]

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