CBCS SCHEME

17CS34

Third Semester B.E. Degree Examination, July/August 2021
Computer Organization

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1   a.   Explain the overall SPEC rating for the computer in a program suite.   **(04 Marks)**
    b.   Consider a computer that has a byte addressable memory organize in 32 bit words. A program reads ASCII characters entered at a keyboard and store them in successive byte location starting at 2000. Show how the contents of three memory words at locations 2000, 2004 and 2008 after the string "VTUBELAGAVI" has been entered using
         i)   Big Endian Scheme   ii)   Little Endian Scheme.
         (ASCII codes : V = 56H , T = 54H , U = 55H , B = 42H , E = 45H , L = 4CH , A = 41H , G = 47H , I = 49H).   **(06 Marks)**
    c.   What are Addressing Modes? Explain the following addressing modes with one example for each. Register , Absolute (Direct) , Index and Auto increment.   **(10 Marks)**

2   a.   Explain with neat diagrams and examples, how logical shift and rotate instructions are implemented.   **(12 Marks)**
    b.   Write and explain the basic performance equation.   **(04 Marks)**
    c.   Write a assembly language program to convert unpacked BCD number to packed BCD number.   **(04 Marks)**

3   a.   Explain Memory mapped I/O and I/O mapped I/O.   **(04 Marks)**
    b.   With neat diagram, explain the centralized bus arbitration and distributed bus arbitration schemes.   **(10 Marks)**
    c.   What is Exception? Explain the following exceptions :
         i)   Recovery from errors   ii)   Debugging.   **(06 Marks)**

4   a.   With neat sketch, explain methods for handling multiple devices.   **(12 Marks)**
    b.   Explain the Registers in a DMA interface.   **(04 Marks)**
    c.   Explain the tree structure of USB with split bus operation.   **(04 Marks)**

5   a.   With neat diagrams, explain any two mapping functions used in Cache memory.   **(10 Marks)**
    b.   With neat diagram, explain the internal organization of memory chip (2 MX8 dynamic memory chip).   **(10 Marks)**

6   a.   With neat diagram, explain Magnetic Hard Disk.   **(06 Marks)**
    b.   With neat diagram, explain how Virtual Memory Address translation take place.   **(08 Marks)**
    c.   Explain with neat diagram, the memory hierarchy with respect to Speed, Size and Cost.   **(06 Marks)**

7   a.   Explain the design of a 4 – bit carry- look ahead adder.   **(08 Marks)**
    b.   Multiply (+14) and (-6) using Booth's algorithm.   **(07 Marks)**
    c.   Perform the division of numbers 8 by 3 (8÷3) using Restoration Division method. **(05 Marks)**

8 a. Explain IEEE standard for floating point numbers. **(06 Marks)**
   b. Perform the following operations on the 5 – bit signed numbers using 2's complement representation system. Further indicate whether overflow has occurred :
      i) (-10) + (-13) ii) (-10) – (+4) iii) (+7) – (-15). **(06 Marks)**
   c. With neat diagram, explain the floating addition / subtraction unit. **(08 Marks)**

9 a. List out the actions needed to execute the instruction Add (R_3) , R_1. Write and explain sequence of control steps for the execution of the same. **(08 Marks)**
   b. Write a control sequence for an unconditional branch instruction. **(04 Marks)**
   c. Explain the Three bus organization of the data path. **(08 Marks)**

10 a. With neat diagrams, explain three different ways of implementing a multiprocessor system. **(10 Marks)**
    b. With neat block diagram, explain the working of microwave oven in an embedded system. **(06 Marks)**
    c. With neat diagram, explain a 4 – stage pipeline. **(04 Marks)**

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