

B.Tech III Year I Semester (R15) Regular &amp; Supplementary Examinations November/December 2019

**COMPUTER ORGANIZATION**

(Electronics &amp; Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- If the clock rate is 100 cycles per second, number of actual instructions executed is 200 and average number of steps needed to execute an instruction is 3, find the time required to execute the program.
  - Find the addressing mode of the instructions given below:  
 MOV B,R0  
 ADD 8(R0), R2
  - Represent the number -0.0001456 in 32 bit IEEE standard format.
  - Write the microroutine for the instruction Branch<0.
  - Compare static RAM and DRAM.
  - What would be the main advantage and disadvantage of making the size of cache blocks larger or smaller?
  - What is Data arbitration?
  - The address bus of a computer has 16 address lines  $A_{15-0}$ . The address assigned to device is  $7CA4_{16}$  and the address decoder for that device ignores lines  $A_8$  and  $A_9$ , what are all the addresses to which this device will respond?
  - What is Data Hazard?
  - For a multistage network, if the number of nodes that are to be interconnected using shuffle network is 32, determine the number of stages and number of switches present.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- Write an assembly level program to compute the dot product of two vectors.
  - Explain the role of system software in a computer system.
- OR**

  - With a suitable example, show how performance of a computer system is evaluated.
  - Register R5 is used in a program to point the top of a stack. Write a sequence of instructions using Index, Autoincrement and Autodecrement addressing modes to perform the following tasks:
    - Pop the two items of the stack, add them and then push the results onto the stack.
    - Copy the fifth item from the top into Register R3.
    - Remove the top ten items from the stack.

**UNIT – II**

- Using binary multiplier, show how multiplication of numbers 1101 and 0010 is carried out.
  - Implement the microroutine for the instruction:  
 Add( $R_{src}$ )+, Rdst  
 Using next microinstruction address field.

**OR**

  - Explain about multiple bus organization?
  - How division of two binary numbers 1100/10 is done using restoring technique?

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**UNIT – III**

- 6 (a) Compare and contrast the features of different types of ROMs.  
(b) Explain about Virtual memory.

**OR**

- 7 (a) Discuss the mapping functions of cache.  
(b) Describe the principle operation of Magnetic disk.

**UNIT – IV**

- 8 (a) Design an appropriate interface for connecting a seven segment display as an output device on a synchronous bus.  
(b) Describe the two different modes of operation of Direct Memory Access.

**OR**

- 9 (a) With a suitable example, show how multiple device requests are handled by single interrupt line and multiple interrupt line.  
(b) Develop a circuit to connect printer to a processor and explain its operation.

**UNIT – V**

- 10 (a) With a suitable example, show the effect of addressing modes on instruction flow in the pipeline.  
(b) Explain about array processors.

**OR**

- 11 (a) Discuss about Data Hazards.  
(b) Explain about Hypercube network.

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