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Total number of printed pages:2

D/3rd/DCSE301

2021

COMPUTER ARCHITECTURE AND ORGANIZATION

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) Differentiate between computer architecture and computer organization. 2

   b) What do you mean by a bus? Discuss the different types of buses available in a computer system. 2+6=8

   c) Explain the common bus system of a basic computer with the help of a diagram. 10

2. a) How overflow is detected in a binary addition? Illustrate with the help of an example. 2+3=5

   b) What do you mean by a computer instruction? Draw the diagram of a simple instruction format and explain each part in brief. 2+5=7

   c) Write the purpose of the following computer registers: PC, IR, AR and AC. 4x2=8

3. a) Explain with examples; how effective address is calculated in different types of addressing modes. 12

   b) What is an interrupt? Draw a diagram to show how an interrupt affects the normal processing sequence of a computer processor. 2+6=8

4. a) What are the different types of instructions available based on the various operations performed by a typical computer? Explain in brief and give at least one example from each category. 12

   b) Draw the hardwired control unit of a basic computer and explain each step 8

in detail.

5. a) Explain with diagram the memory hierarchy of a typical computer system. 7

b) Suppose a processor has access to two levels of memory. Level 1 has an access time of 0.5 ns and level 2 has an access time of 9.5 ns. Let us consider that 90% of the memory accesses are found in level 1. Therefore, calculate the average access time required by the processor to access the memory word. 5

c) What is a cache memory? Draw a flowchart and explain how a read operation is performed in a cache? 2+6=8

6. a) What is the function of an I/O module? 2

b) Draw the block diagram of an I/O module and explain its structural components. 6

c) What are the three different techniques for performing an I/O operation? Discuss in brief. 3x4=12

7. a) Write short notes on the following: 5x2=10

i. Program Status Word (PSW)

ii. Memory Mapped I/O Vs Isolated I/O

b) What do you mean by virtual memory? Explain the virtual address mapping technique in a computer with main-memory capacity of 32K words and auxiliary memory of 1024K words with the help of a diagram. 2+8=10

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