

III B. Tech I Semester Regular/Supplementary Examinations, March – 2021
COMPUTER ARCHITECTURE AND ORGANIZATION

(Common to Electronics and Communication Engineering, Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**
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PART –A**(14 Marks)**

1. a) What is a Big – Endian and Little- Endian representation? [2M]
- b) What do you mean by assembler directives? [2M]
- c) What is bit pair recoding? Give an example. [2M]
- d) What is PCI bus? [3M]
- e) Define Memory Access time and memory cycle time. [3M]
- f) Define micro routine and micro instruction. [2M]

PART –B**(56 Marks)**

2. a) Discuss the design of a basic computer. [7M]
- b) Compare single bus structure and multiple bus structure with examples. [7M]
3. a) List out the various Shift and Rotate Instructions with examples. [7M]
- b) What do you mean by assembly language? Write an assembly language program to read two values and perform an arithmetic operation on it. [7M]
4. a) Perform the arithmetic operations (+42)+(-13) and (-42)-(-13) in binary using signed 2's complement representation for negative numbers. [7M]
- b) Explain how Index addressing mode, Immediate addressing mode and Relative addressing mode work? [7M]
5. a) Explain the different methods used for handling the situation when multiple interrupts occurs. [7M]
- b) Explain the following: [7M]
 - i) interrupt controller
 - ii) polling
 - iii) Enabling and Disabling Interrupts.
6. a) Describe any six ways of improving the cache performance. [7M]
- b) Discuss about Magnetic Hard Disks. [7M]
7. a) Explain the difference between micro programmed control and hardwired control. [7M]
- b) Explain the design of Control unit with a neat diagram. [7M]



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PART -A**(14 Marks)**

1. a) Explain about Bus structure. [2M]
- b) What is indirect addressing mode? [2M]
- c) What is signed binary? Give example. [2M]
- d) What do you mean by memory mapped I/O? [3M]
- e) What do you mean by static memories? [3M]
- f) What are the features of the hardwired control? [2M]

PART -B**(56 Marks)**

2. a) Draw and explain the basic block diagram of a digital computer. Also list the different types of computers. [7M]
- b) What is Application Software? Explain with examples. [7M]
3. a) Explain the role of Stacks and Queues in computer programming equation. [7M]
- b) List and explain different instruction formats. [7M]
4. a) Explain the algorithms for performing arithmetic operations with decimal data. [7M]
- b) With examples explain the Branch type instructions. [7M]
5. a) Explain the Direct Memory Access. How it improves the performance of the system? [7M]
- b) Distinguish between Synchronous Bus and Asynchronous Bus. [7M]
6. a) Discuss the different mapping techniques used in cache memories and their relative merits and demerits. [7M]
- b) How can you enhance the speed and capacity of memories? Explain. [7M]
7. a) Explain the concept of micro programmed control unit. [7M]
- b) Formulate a mapping procedure that provides eight consecutive micro instructions for each routine. The operation code has 7 bits and control memory has 2048 words. [7M]

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PART –A**(14 Marks)**

1. a) What are the basic functional units of a computer? [2M]
- b) Define auto increment mode of addressing? Give example. [2M]
- c) What are the logic instructions? [2M]
- d) Write the factors to be considered in designing an I/O subsystem. [3M]
- e) Define Hit and Miss. [3M]
- f) Name some register output control signals. [2M]

PART –B**(56 Marks)**

2. a) What is a System Software? Explain with examples. [7M]
- b) Write briefly about the evolution of a Computer Architecture. [7M]
3. a) Explain three-address, two-address, one-address, and zero-address instructions with an example. [7M]
- b) Write register transfer instructions for the following bit operations: [7M]
 - i) Select complement, ii) Select clear, iii) Insert, iv) Right circular shift.
4. a) Explain the design of a 4-bit Arithmetic unit with two selection variables, which performs the basic arithmetic functions. [7M]
- b) Define addressing modes. What are the different types of addressing modes? Explain them with examples. [7M]
5. a) What is an I/O Interface? What are the functions of typical I/O interface? Explain. [7M]
- b) Discuss the DMA operation with neat diagram in detail. [7M]
6. a) What are the various semiconductor memories available? Explain. [7M]
- b) Write short notes on Optical Disks. [7M]
7. a) Discuss the Fundamental Concepts of Register Transfers. [7M]
- b) Explain in detail various fields of micro-instruction format with a neat diagram. [7M]



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PART –A**(14 Marks)**

1. a) Give the basic performance equation. [2M]
- b) What is the difference between Stack and Queue? [2M]
- c) List the basic instruction types. [2M]
- d) Why I/O devices cannot be directly connected to the system bus? [3M]
- e) Write the formula for the average access time experienced by the processor in a system with two levels of caches. [3M]
- f) What are the factors that determine the control signals? [2M]

PART –B**(56 Marks)**

2. a) Explain the various Data types that are represented in computers with example. [7M]
- b) Explain various historical developments in computer architecture with respect to its performance improvement. [7M]
3. a) With a neat diagram, describe the various registers in a typical CPU. [7M]
- b) Write an assembly language program to count odd numbers of 1 to 100. [7M]
4. a) Explain various I/O operations used to perform read and write operations. [7M]
- b) Multiply the following pair of signed 2's complement number using Booth multiplication Algorithm:
A = 010111
B = 101100. [7M]
5. a) Write the factors considered in designing an I/O subsystem and explain them. [7M]
- b) Define the following: [7M]
 - i) Interrupt, ii) Priority Interrupt, iii) Interrupt Hard ware.
6. a) Write notes on Internal organization of ROM memories. [7M]
- b) Write short notes on secondary storage devices. [7M]
7. a) What are the two approaches used for generating the control signals in proper sequence? Explain any one. [7M]
- b) Explain address sequencing in micro programmed control unit. [7M]

