

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019
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**

PART –A

(14 Marks)

- | | | | |
|----|----|--|------|
| 1. | a) | How to improve the clock rate of processor? | [2M] |
| | b) | Write about relative addressing. | [2M] |
| | c) | What is back patch policy? How it is used in indexed addressing? | [2M] |
| | d) | Write the responsibilities of PCI bus in computer system. | [3M] |
| | e) | What is the role of disk controller in secondary storage? | [3M] |
| | f) | Discuss instruction execution steps. | [2M] |

PART –B

(54 Marks)

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|----|-----|--|-------|
| 2. | a) | With neat sketch explain the blocks of computer system and the way they communicate with each other. | [7M] |
| | b) | Explain various milestones in the development of generations of computers and its hardware. | [7M] |
| 3. | a) | How to execute instructions using straight line sequencing and branching? Give example. | [7M] |
| | b) | X=10001, Y=32. Perform various shift and rotate operations on X and Y and explain. | [7M] |
| 4. | a) | Write an assembly program and explain the instructions for finding matrix multiplication. | [7M] |
| | b) | What is the format of arithmetic instruction in assembly language? Elaborate variants of OP code in it. | [7M] |
| 5. | a) | Write and explain the characteristics and addressing issues of USB device. | [7M] |
| | b) | How to handle simultaneous interrupts using daisy chaining and priority? Explain in detail. | [7M] |
| 6. | a) | Describe the working principle of flash memory and read only memories with applications. | [7M] |
| | b) | Compare the operations of write-through protocol, copy-back protocol and early restart protocol of cache memory. | [7M] |
| 7. | | Explain the following. | [14M] |
| | i) | Single bus organization of the data path inside a processor. | |
| | ii) | Micro program sequencing. | |

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PART -A**(14 Marks)**

- | | | | |
|----|----|---|------|
| 1. | a) | What is the role of optimizing compiler? | [2M] |
| | b) | Write about additional considerations in additional addressing modes. | [2M] |
| | c) | Write steps to find branch target address. | [2M] |
| | d) | How interrupts are used for control transfer between programs? | [3M] |
| | e) | Differentiate RAM and ROM. | [3M] |
| | f) | Define micro programmed control. | [2M] |

PART -B**(54 Marks)**

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|----|-----|--|-------|
| 2. | a) | $A=A+B*60$. Explain the role of general-purpose registers in executing this instruction. | [7M] |
| | b) | What is system software? Explain its functionalities in detail. | [7M] |
| 3. | a) | What is the significance of addressing modes? Explain Direct, Immediate and relative addressing modes with examples. | [7M] |
| | b) | How to use registers for parameter passing? Explain with subroutine instructions. | [7M] |
| 4. | a) | Discuss every field of instruction format and also register structure. | [7M] |
| | b) | Describe the role of I/O operations in reading a line of characters and displaying it with help of assembly pseudo code. | [7M] |
| 5. | a) | What is PCI bus? How a read operation is performed with different data transfer signals? Explain in detail. | [7M] |
| | b) | What are the differences between synchronous bus and asynchronous bus? Explain. | [7M] |
| 6. | a) | What is an Optical disk? How it can be used to support large storage in computer system? Explain. | [7M] |
| | b) | Explain different memory allocation techniques used in cache memory. | [7M] |
| 7. | | Explain the following: | [14M] |
| | i) | Role of MDR in fetching a word from memory. | |
| | ii) | Control sequence that implements unconditional branch instructions. | |

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PART -A

(14 Marks)

- | | | | |
|----|----|--|------|
| 1. | a) | Write about superscalar operations. | [2M] |
| | b) | What are the basic and input and output operations? Discuss. | [2M] |
| | c) | What are the two different logic operations? | [2M] |
| | d) | What is the significance of DMA? | [3M] |
| | e) | Distinguish between EPROM and EEPROM. | [3M] |
| | f) | Discuss basic organization of micro programmed control. | [2M] |

PART -B

(54 Marks)

- | | | | |
|----|-----|---|-------|
| 2. | a) | Can a Processor clock and clock rate influence the performance of computer? Discuss. | [7M] |
| | b) | Suppose two numbers located in memory are to be added. What are the functional units of digital computer system will carry out this? Explain. | [7M] |
| 3. | | In how many ways the location of an operand is specified in an instruction? Explain each mode with suitable examples. | [14M] |
| 4. | a) | Discuss the role of condition codes in the execution of branch instructions. | [7M] |
| | b) | Explain various logical instruction formats and also how to use them in packing decimal digits into bytes? | [7M] |
| 5. | a) | What is asynchronous bus? Explain how to use handshake control protocol in it. | [7M] |
| | b) | Explain how multiple interrupts are handled by nested interrupts? | [7M] |
| 6. | a) | Discuss advantages and disadvantages of different ROM configurations. | [7M] |
| | b) | How to organize data on a disk? Explain how the operating systems support for it? | [7M] |
| 7. | | Explain the following. [14M] | |
| | i) | Conditional branching micro program. | |
| | ii) | Vertical /horizontal organization of micro instructions. | |
