Code No: **R1631041** **R16** SET - 1

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**

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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)

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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Time: 3 hours Max. Marks: 70

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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)

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: i) Role of MDR in fetching a word from memory. ii) Control sequence that implements unconditional branch instructions.	[14M]

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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)	Write about the bus structure used in computer.	[2M]
	b)	Perform left and right shift operations on any binary data of size 8 bits.	[2M]
	c)	Discuss the role of load/store in multiple operands.	[2M]
	d)	Write short notes on vector interrupts.	[3M]
	e)	Compare static and dynamic RAM.	[3M]
	f)	What is wide-branch addressing? Explain.	[2M]

PART –B (54 Marks)

2.	a)	Discuss the role of instruction set contribution in increasing the performance of a computer system.	[7M]
	b)	Explain the applications of various computers in solving real world problems.	[7M]
3.	a)	Write and explain register transfer notations for all instruction types with examples.	[7M]
	b)	Write an assembly language program to illustrate assembly directives.	[7M]
4.	a)	What is indexed addressing mode? Explain various types of indexed addressing modes.	[7M]
	b)	Explain the branch type instructions with examples.	[7M]
5.	a)	What is SCSI bus? Explain its operational steps with a neat sketch.	[7M]
	b)	What are the applications and functions of combined input/output interface? Explain.	[7M]
6.	a)	How to design memory hierarchy? Explain the issues to be considered in its design.	[7M]
	b)	What are different RAID levels? Explain various design issues in each level to achieve reliable storage.	[7M]
7.		Explain the following: i) Basic operation of micro programmed control unit. ii) Input and output gating of ALU.	[14M]

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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)	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. i) Conditional branching micro program. ii) Vertical /horizontal organization of micro instructions.	[14M]

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