Printed Page:- 04 Subject Code:- BMICSE0305

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech (Integrated)

SEM: III - THEORY EXAMINATION (2024 - 2025)

Subject: Computer Organization and Architecture

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. The third state of a Three-state Buffer is _____(CO1,K2) 1

(a) 0

(b) High Impedance

(c) 1

(d) Short circuit

1-b. _____ points at the address of next instruction to be fetched in the program.(CO1,K1) 1

(a) Stack Pointer

(b) Instruction Register

(c) Index Pointer

(d) Program Counter

1-c. The sign magnitude representation of -1 is _____. (CO2,K2) 1

(a) 1010

(b) 1110

(c) 1000

(d) 1001

1-d. _____ is a example of shift microoperation.(CO2,K1) 1

(a) ashl

(b) RISC

(c) CISC
(d) CAM

1-e. The time required to complete one instruction is called.(CO3,K1) 1

(a) Fetch time
(b) Execution time
(c) Control time
(d) All of these

1-f. The computer architecture aimed at reducing the time of execution of instructions is _____(CO3,K1) 1

(a) CISC
(b) RISC
(c) ISA
(d) ANNA

1-g. Property of locality of reference may fail, if a program has_____(CO4,K2) 1

(a) many conditional jumps
(b) many unconditional jumps
(c) many operand
(d) many operators

1-h. 2k* 8 ROM chips which are required to built a 16K*8 memory system are of number _____. (CO4,K2) 1

(a) 2
(b) 4
(c) 8
(d) 16

1-i. An example of a device capable of recognizing a pre-specified type of mark made by pencil or pen is_____(CO5,K1) 1

(a) OMR
(b) Winchester
(c) Bar code reader
(d) Image Scanner

1-j. Input or output devices attached to the computer are also called as _____(CO5,K1) 1

(a) Interrupt
(b) Secondary storage devices
(c) Peripheral Devices
(d) Memory

2. Attempt all parts:-

2.a. Differentiate between Memory read and Memory write operation.(CO1,K2) 2

2.b.	Show the value of 11010010 after the logical shift left and right.(CO2,K3)	2
2.c.	Write down five steps of instruction cycle.(CO3,K2)	2
2.e.	Explain the difference between paging and segmentation .(CO4,K3)	2
2.d.	Define difference between interrupt and exception(CO5,k2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Explain how General Register Organization works with the help of diagram.(CO1,K2)	6
3-b.	Explain the following addressing modes with examples i. Register Indirect addressing ii) Immediate Addressing iii. Register direct Addressing. (CO1,K2)	6
3-c.	Explain single precision and double precision representation of floating point numbers with an example.(CO2,K3)	6
3-d.	Solve +15 X -13 using booth algorithm. Assume 5 bit registers that hold signed numbers.(CO2,K3)	6
3.e.	Differentiate between hardwired and micro-programmed control unit. (CO3,K2)	6
3.f.	Define set associative mapping in cache memory. (CO4.K3)	6
3.g.	Explain how DMA transfer is accomplished with the help of diagram. (CO5,K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Define three state buffers? Explain the memory transfer and bus transfer with the help of memory read and memory write operation.(CO1,K2)	10
4-b.	Define Stack and explain the steps required to perform PUSH and POP operation in memory stack.(CO1,K2)	10

5. Answer any one of the following:-

5-a.	Show the hardware diagram of Booth algorithm and signed magnitude algorithm for multiplication and explain it.(CO2,K2)	10
5-b.	Explain the IEEE 754 floating point representation with examples.(CO2,K2)	10

6. Answer any one of the following:-

6-a.	Perform Starting from an initial value R=011010101,determine the sequence of binary values in R after ashl, followed by ashr, followed by shl and circular shift right,followed by ashr.(CO3,K3)	10
6-b.	Discuss the types of Flynn's classification. Explain with suitable diagrams. (CO3,K2)	10

7. Answer any one of the following:-

7-a.	Perform LRU and FIFO page replacement algorithm for frame size 3 which is empty in starting and reference string is 7,1,2,3,4,3,5,7,4,5.Find out page fault and hit ratio.(CO4,K3)	10
7-b.	Consider a direct mapped cache of size 16 KB with block size 256 bytes. The size of main memory is 128 KB. Find- 1. Number of bits in tag 2. Tag directory	10

size(CO4,K3)

8. Answer any <u>one</u> of the following:-

8-a.	Explain the difference between synchronous and asynchronous communication and explain data transfer using block diagram and timing diagram.(CO5,K2,)	10
8-b.	Define interrupt and Explain different types of interrupts and exceptions. (CO5,K2)	10