**Printed Page:-03** **Subject Code**:- **AMICSE0305**

**Roll. No:**

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**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 & 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. If register is 32,and each register is 64 bit long each, then what is the size of decoder.(CO1,K1) 1

(a) 4 X 32

(b) 5 X 32

(c) 6 X 64

(d) 5 X 64

1-b. The addressing mode in which the operands are specified implicitly in the instruction. (CO1,K1) 1

(a) Indirect addressing mode

(b) Index addressing mode

(c) Relative addressing mode

(d) Implied addressing mode

1-c. _____ is responsible for arithmetic operation. (CO2,K1) 1

(a) Control unit

(b) ALU

(c) Memory unit

(d) I/O unit

1-d. Carry lookahead adder uses the concepts of .(CO2,K1) 1

(a) Inverting the inputs

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(b) Complementing the outputs
(c) Generating and propagating carries
(d) None of the mentioned

1-e. How many address bits are required to represent a 32 K memory? (CO3,K1) 1

(a) 10 bits
(b) 12 bits
(c) 14 bits
(d) 15 bits

1-f. A sequence of control words corresponding to a control sequence is called (CO3,K1) 1

(a) Micro routine
(b) Micro function
(c) Micro procedure
(d) None of the mentioned

1-g. The circuit used to store one bit of data is known as ___ (CO4,K1) 1

(a) RAM
(b) ROM
(c) Flip-Flop
(d) None of above

1-h. Cache memory is made by (CO4,K1) 1

(a) DRAM
(b) SRAM
(c) RAM
(d) ROM

1-i. Data can be transmitted between two points in three different modes: Simplex, _____ and _____.(CO5,K1) 1

(a) Half & Full duplex
(b) Full duplex
(c) Half Duplex
(d) None of above

1-j. DMA stands for _____(CO5,K1) 1

(a) Direct memory Access
(b) Direct memory Activity
(c) Destination memory Activity
(d) None of above

2. Attempt all parts:-

2.a. Differentiate between Register mode and register indirect mode.(CO1,K4) 2

2.b. Explain the hardware diagram of Booth multiplication algorithm(CO2,K4) 2

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| | | |
|---|---|---|
| 2.c. | Write down five steps of instruction cycle.(CO3,K1) | 2 |
| 2.d. | Give the classification of memory.(CO4,K1) | 2 |
| 2.e. | Describe the difference between bus grant and bus request in DMA.(CO5,K4) | 2 |

**SECTION-B** 30

3. Answer any five of the following:-

| | | |
|---|---|---|
| 3-a. | Define Indirect address mode and relative address mode with suitable example.(CO1,K1) | 6 |
| 3-b. | Draw the diagram of bus system that uses three state buffers and 2:4 decoder instead of multiplexers and Explain how it works. (CO1,K4) | 6 |
| 3-c. | Why CLA is differ from Full adder using suitable diagram.(CO2,K3) | 6 |
| 3-d. | Explain the flow diagram of signed magnitude multiplication algorithm.(CO2,K4) | 6 |
| 3.e. | Show the zero and three address instruction for given equation: M = (I * K) + (J - L) (CO3,K5) | 6 |
| 3.f. | Describe in detail about associative memory mapping. (CO4,K4) | 6 |
| 3.g. | Explain Daisy Chaining method of establishing priority with diagram. (CO5,K4) | 6 |

**SECTION-C** 50

4. Answer any one of the following:-

| | | |
|---|---|---|
| 4-a. | Explain push and pop operations for both Register stack and Memory stack. (CO1,K4) | 10 |
| 4-b. | Explain seven registers CPU organization with the help of block diagram and control word. (CO1,K4) | 10 |

5. Answer any one of the following:-

| | | |
|---|---|---|
| 5-a. | Explain the IEEE 754 floating point representation with examples.(CO2,K4) | 10 |
| 5-b. | Perform the -3 X -5 with the help of booth algorithm.(CO2,K5) | 10 |

6. Answer any one of the following:-

| | | |
|---|---|---|
| 6-a. | Draw and explain the concept of Pipelining with the help of suitable example.(CO3,K4) | 10 |
| 6-b. | Give the micro instruction format and specify the working of each field.(CO3,K3) | 10 |

7. Answer any one of the following:-

| | | |
|---|---|---|
| 7-a. | Explain the concept of virtual memory. Define latency, throughput and band width also. (CO4,K4) | 10 |
| 7-b. | What is Memory hierarchy? Explain the purpose to construct such memory hierarchy in digital computers.(CO4,K4) | 10 |

8. Answer any one of the following:-

| | | |
|---|---|---|
| 8-a. | What is DMA Controller? Draw and explain the block diagram of DMA Controller. (CO5,K4) | 10 |
| 8-b. | Write short notes on a) Serial communication b) Input-Output Processor (CO5,K3) | 10 |