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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
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   1
         decoder.(CO1,K1)

   (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   1
         instruction.   (CO1,K1)

   (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

(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

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 <u>five</u> 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 <u>one</u> 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 <u>one</u> 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 <u>one</u> 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 <u>one</u> 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 <u>one</u> 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