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Sub Code: KCS-302
Roll No.

B. TECH.
(SEM III) THEORY EXAMINATION 2022-23
COMPUTER ORGANIZATION AND ARCHITECTURE

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) List the steps involved in an instruction cycle.
(b) How memory read and write operations are performed in computer system?
(c) Define bus and memory transfer?
(d) Define HIT and MISS ratio in memory with an example.
(e) Define instruction cycle.
(f) Differentiate between RISC and CISC.
(g) List the difference between static RAM and dynamic RAM.
(h) Define Virtual memory.
(i) List down the functions performed by an Input/Output unit.
(j) Why does the DMA get priority over CPU when both request memory transfer?

SECTION B

2. Attempt any *three* of the following: **10x3=30**

(a) Explain functional units of computer system in detail.
(b) Explain IEEE-754 standard for floating point representation. Express $(314.175)_{10}$ in all the IEEE-754 models.
(c) Explain the concept of pipelining and also explain types of pipelining.
(d) Consider a cache consisting of 256 blocks of 16 words each for a total of 4096 words and assume that the main memory is addressable by a 16 bits address and it consists of 4K blocks. How many bits are there in each of TAG, SET, WORD field for 2-way set associative technique?
(e) Define interrupt. Also discuss different types of interrupt.

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

(a) Explain about stack organization used in processors. What do you understand by register stack?
(b) What is an effective address? How it is calculated in different types of addressing modes? Explain.

4. **Attempt any *one* part of the following:** **10x1=10**

(a) Describe the derivation procedure of look ahead carry adder by an example with the help of block diagram.

(b) Show the systematic multiplication process of (-15) × (-16) using Booth's Algorithm.

5. **Attempt any *one* part of the following:** **10x1=10**

(a) Write a program to evaluate the arithmetic statement.
$P = ((X - Y + Z) * (A \wedge B))/(C \wedge D * E)$
By using (i) Two address instructions (ii) One address instructions (iii) Zero address instructions

(b) What are the differences between hardwired and micro-programmed control unit?

6. **Attempt any *one* part of the following:** **10x1=10**

(a) Discuss the Memory Hierarchy in computer system with regard to Speed, Size and Cost.

(b) Write a short notes on magnetic disk, magnetic tape and optical disk.

7. **Attempt any *one* part of the following:** **10x1=10**

(a) With a neat schematic diagram, explain about DMA controller and its mode of data transfer.

(b) Discuss the design of a typical input or output interface.