

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 $(-15) \times (-16)$ 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.