(c) Explain Strobe control and Handshaking Asynchronous Data Transfer method in detail. (CO4)

5. (a) What is a cache memory ? Explain the various mapping techniques of cache memory. (CO5)

(b) A digital computer has memory unit a 64 K * 16 and a cache memory of 1 K words. The cache uses direct mapping with a block size of 4 words. (CO5)

How many bits are there in the tab, index, block and word fields ?

How many bits are there in each word of cash and how are they divided into functions ? Include a valid bit ?

How many blocks can be accommodate ?

(c) What do you understand by the term locality of reference ? Show the memory hierarchy with the help of a diagram showing speed, cost, and size variation. (CO5)

H Roll No. 22922104

TBC–304/TBI–304

B. C. A./B. Sc. (IT)

(THIRD SEMESTER) END SEMESTER EXAMINATION, Dec., 2023

COMPUTER ORGANIZATION AND ARCHITECTURE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What do you understand by Resistor-Transistor Logic (RTL) ? List the characteristics of RTL family. Describe the basic symbols for Register Transfers. (CO1)

(b) Draw a diagram of bus system for four register of 4 bits each. The bus is to be constructed with multiplexer. Also explain the working of common bus system.(CO1)

(c) Starting from an initial value of R=11011101, determine the sequence of binary values in R after a logical shift-left, followed by a circular shift-right, followed by a logical shift-right and a circular shift-left. (CO1)

2. (a) What is Address sequencing ? Explain with the help of flow chart. (CO2)

(b) What do you understand by micro-programming ? Discuss about micro-programmed control unit, using a block diagram. Compare it with the hardwired control unit. (CO2)

(c) The 8 bit registers A, B, C and D initially have the following values : (CO2)

$A = 01101100$

$B = 01010100$

$C = 01010011$

$D = 10001100$

after the execution of the following sequence of micro operations :

$A \leftarrow A + D$

$A \leftarrow A - C$

$B \leftarrow B \wedge C$

Determine the new value in each register.

3. (a) Write a program to evaluate the arithmetic statement : (CO3)

$A*B+C*D$

(i) Using a general register computer with three address instruction.

(ii) Using a general register computer with two address instruction.

(iii) Using a stack organized computer with zero address instruction.

(b) Explain any *five* Addressing mode with help of suitable example. (CO3)

(c) What do you mean by Pipelining ? Also explain arithmetic pipelining in detail. (CO3)

4. (a) Explain Direct Memory Access in detail. (CO4)

(b) Explain I/O interface ? What are the functions of an I/O interface ? (CO4)