

(4) TBC-304/TBI-302

4. (a) What is asynchronous data transfer ? What are different types of asynchronous data transfer ? (CO4)
- (b) Describe Direct Memory Access (DMA) ? How DMA is used to transfer data from peripheral devices ? (CO4)
- (c) Explain different Modes of Data transfer. (CO4)
5. (a) Explain Memory Hierarchy on the basis of speed, size and cost parameters. (CO5)
- (b) Write short notes on the following : (CO5)
- (i) RAM
 - (ii) ROM
 - (iii) Auxiliary memory
 - (iv) Virtual memory
- (c) Write a short note on cache memory performance considerations. Explain what are the various methods to write into cache ? (CO5)

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H Roll No.

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

(THIRD SEMESTER)

END SEMESTER

EXAMINATION, Jan., 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) The 8-bit register AR, BR, CR and DR initially have the values :

AR = 11110010, BR = 11111111,

CR = 10111001, DR = 11101010

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Determine the 8-bit values in each register after the execution of following sequence of microoperations : (CO1)

(i) $AR \leftarrow AR + BR$

(ii) $CR \leftarrow CR \vee DR$

(iii) $BR \leftarrow BR + 1$

(iv) $DR \leftarrow AR \wedge DR$

(b) Design and explain Shift microoperations with the help of its hardware implementation. (CO1)

(c) A digital computer constructed with multiplexers has common bus system for 8 registers of 16 bits each : (CO1)

(i) What is the size of multiplexers ?

(ii) How many multiplexers are there in the bus ?

(iii) How many selection inputs are there in each multiplexer ?

2. (a) What is assembly language ? Write assembly language program to subtract two 8 bits numbers stored in any memory locations. (CO2)

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(b) Explain Micro-instruction Format ? Write micro-program for FETCH routine. (CO2)

(c) What is control unit ? Explain *two* methods of implementing control unit. (CO2)

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

$$X = (A + B) \times (C + D)$$

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

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

(iii) Using a Accumulator type computer with one address instruction.

(iv) Using a Stack Organized computer with zero address instruction.

(b) Discuss General register organization. Find the control word of microoperation $R_1 \leftarrow R_2 - R_3$? (CO3)

(c) The time delay for four segments in the pipeline are as follows :

$t_1 = 50 \text{ ns}$ $t_2 = 30 \text{ ns}$ $t_3 = 95 \text{ ns}$ and $t_4 = 45 \text{ ns}$, the non-pipelined system takes 50 ns to process a task.

Determine the speedup ratio of the pipeline for 100 tasks. (CO3)

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