

01-Mar-2021 10:21:21 am

RESPONSE SHEET For Online Assessment March - 2021

Department: Information Technology

Date: 01 - 03 - 2021

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Scholar Number: 19U03068

Semester: 4th

Regular/ Supply:

Subject Name: Computer Organization And
Architecture

Subject Code: IT - 222

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01-Mar-2021 10:21:41 am

Scholar Number 19U03068

Date 01-03-2021

Page No: 1

Signature satyam

Q. No.

Q.1

A) The given values for the 8-bit registers are

$$R1 = 11110010$$

$$R2 = 11111111$$

$$R3 = 10111001$$

$$R4 = 11101010$$

Rough Work (If Required)

a) $R1 \leftarrow R1 + R2$

$$R1 : 11110010$$

$$R2 : 11111111$$

$$\underline{R1 \text{ after: } (1)11110001}$$

b) $R3 \leftarrow R3 \text{ AND } R4$

$$R3 : 10111001$$

$$R4 : 11101010$$

$$\underline{R3 \text{ after: } 10101000}$$

c) $R2 \leftarrow R2 + 1$

$$R2 : 11111111$$

$$\underline{00000000}$$

d) $R1 \leftarrow R1 - R3$

$$R1 - R3 = 11110001 - 10101000$$

$$= 11110001 + \sim(10101000) + 1$$

$$= 11110001 + 01010111 + 1$$

01-Mar-2021 10:21:54 am

Scholar Number 19UD3068

Date 01-03-21

Page No: 2

Signature Satyam

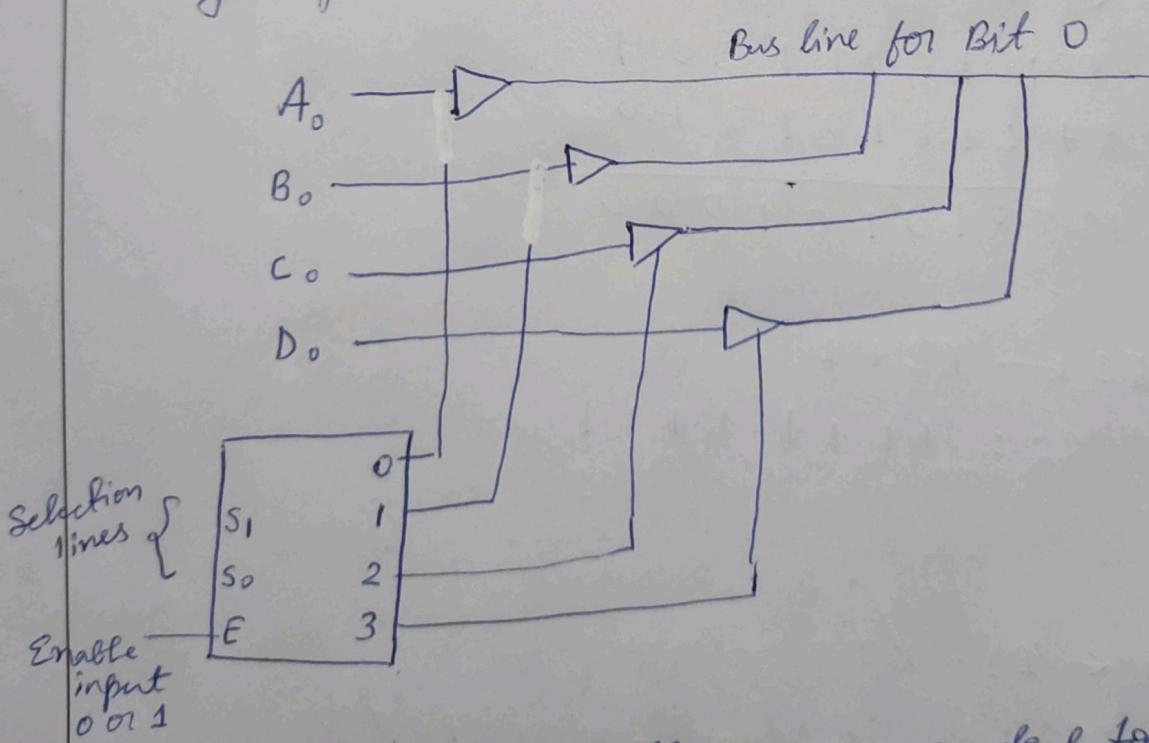
Q. No.

Rough Work (If Required)

$$\begin{array}{r}
 = 1111\ 0001 \\
 + 0101\ 0111 \\
 + 0000\ 0001 \\
 \hline
 01001\ 001
 \end{array}$$

$$\therefore R_1 = 01001001$$

B) The number of wires will be excessive if connection are made between the outputs of each register and the inputs of the other register. A more efficient scheme for transferring information in a system with many registers is to use a common bus.



- The output of 4 buffer are connected together to form a single bus line.
- No more than one buffer in a active state at a given time.

01-Mar-2021 10:40:06 am

Scholar Number 19003068

Page No: 3

Date 01-03-2021

Signature satyam.

Rough Work (If Required)

Q. No.

Q.2

A)

A : 11011001

Solⁿ a) A : 11011001

$$\begin{array}{r} B : 10100100 \\ \hline 01101101 \end{array} \quad (\text{selective Complement})$$

b)

A : 11011001

$$\begin{array}{r} B : 00111100 \\ \hline 11111101 \end{array}$$

(selective set)

B)

Q.No.

Rough Work (If Required)

- 3) Direct Addressing Instruction: Contains the effective address of the operand.
- Access of data is done through a single reference of memory.
 - It firstly reads the instruction and then read the operand.
 - It has faster memory access and it requires small address space.

- Indirect Addressing Instruction: Provides the address for the part of memory where the effective address is stored.
- It has mostly references of the memory to search the operand and lowers the execution speed as well.
 - It firstly reads the instruction, then it reads the effective address and lastly reads the operand.
 - It requires large address space.

- Direct address instruction needs two references to the memory ; (1) Read operand
- 1) Read instruction ; (2) Read operand
- Indirect address instruction needs 3 references to the memory .
 - 1) Read instruction 2) Read effective address
 - 3) Read operand .

Q. No.

Rough Work (If Required)

4. (A) Hardwired are control unit which is implemented with gates, flip-flops, decoders and others.
 → It requires changes in the wiring among the various components if design has to be modified or changed.

whereas, In Micro-programmed control unit, any required changes or modifications can be done by updating the micro program in control memory

Micro-operation: The operation executed on data, stored in registers are called micro-operation.

Micro-instruction: It activates a particular circuit to perform part of the operation specified by a machine instruction.

Micro-program: A program that controls the function of a central processing unit of a computer

Microcode: A low-level instruction set which is stored permanently in a computer or peripheral controller and controls the operation of device.

B)
 No. of register = 16

- a) No. of MUX is 32 as each register is 32 bits
 b) No. of selection inputs for MUX $A = \log_2 32 = 5$

Q. No.

Q.S
A)Rough Work
Required)

The stack pointer SP register is initialized to 3000. The microoperations are :-

Push operation

$SP = SP - 1$ Decrement SP
 $M[SP] \leftarrow DR$ write on top

Pop operation:

$DR \leftarrow M[SP]$ Read

$SP \leftarrow SP + 1$ Increment SP

(B)

Here,

W, Instruction is stored at location 100.

Y, Address field at " 401

Value of " 500

X, RI : 200

a) direct : 2-401

b) Immediate:

c) Relative : ~~201+401+200~~ $402 + 500 = 902$.d) register indirect: $M[Y] = 500$ e) Index with RI as Index register : $401 + 200 = 601$