Name : Laegra Adhikary

ID : 2519170011

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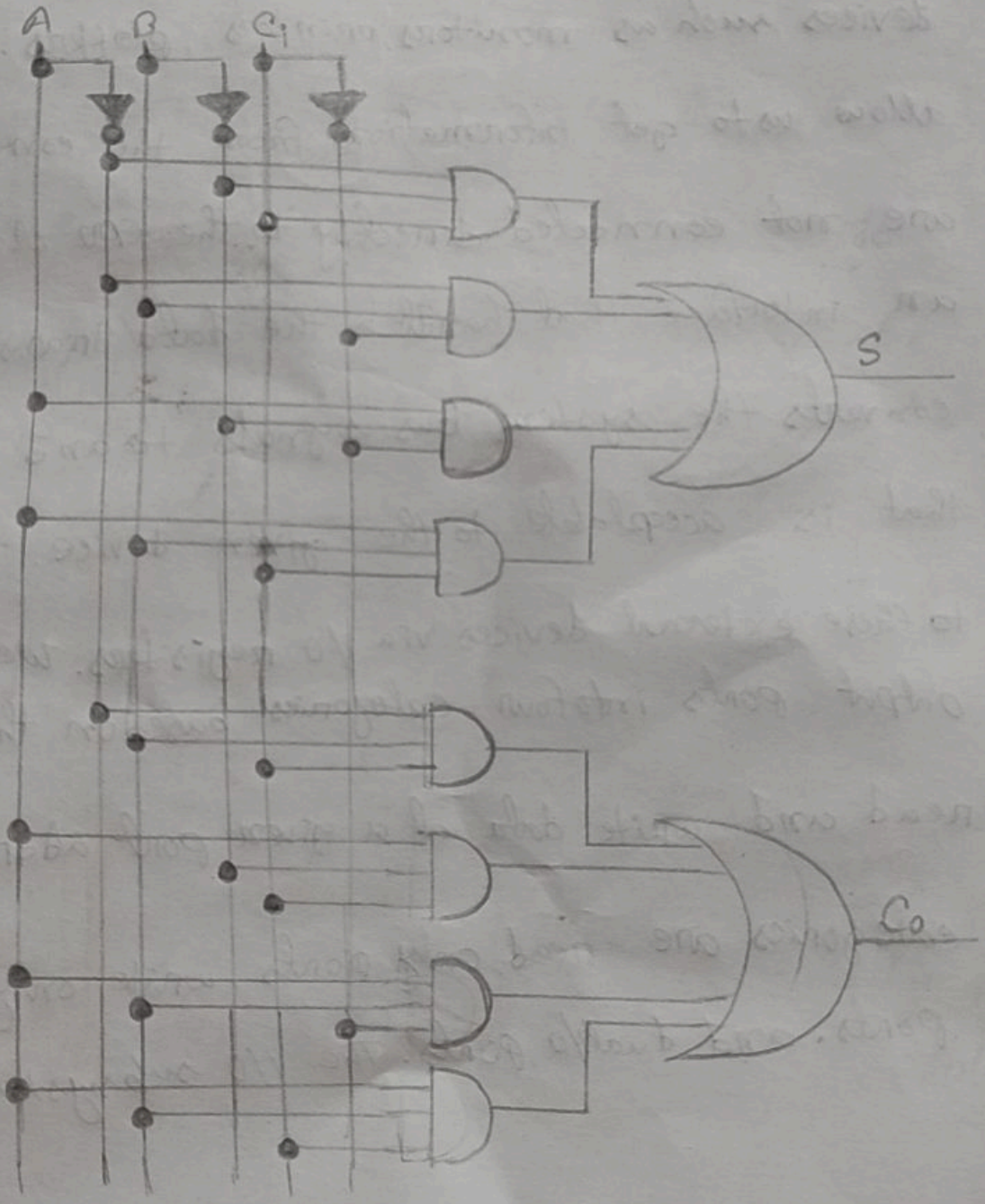
Course code : CSE-233

Answer to the Question NO-1(a)

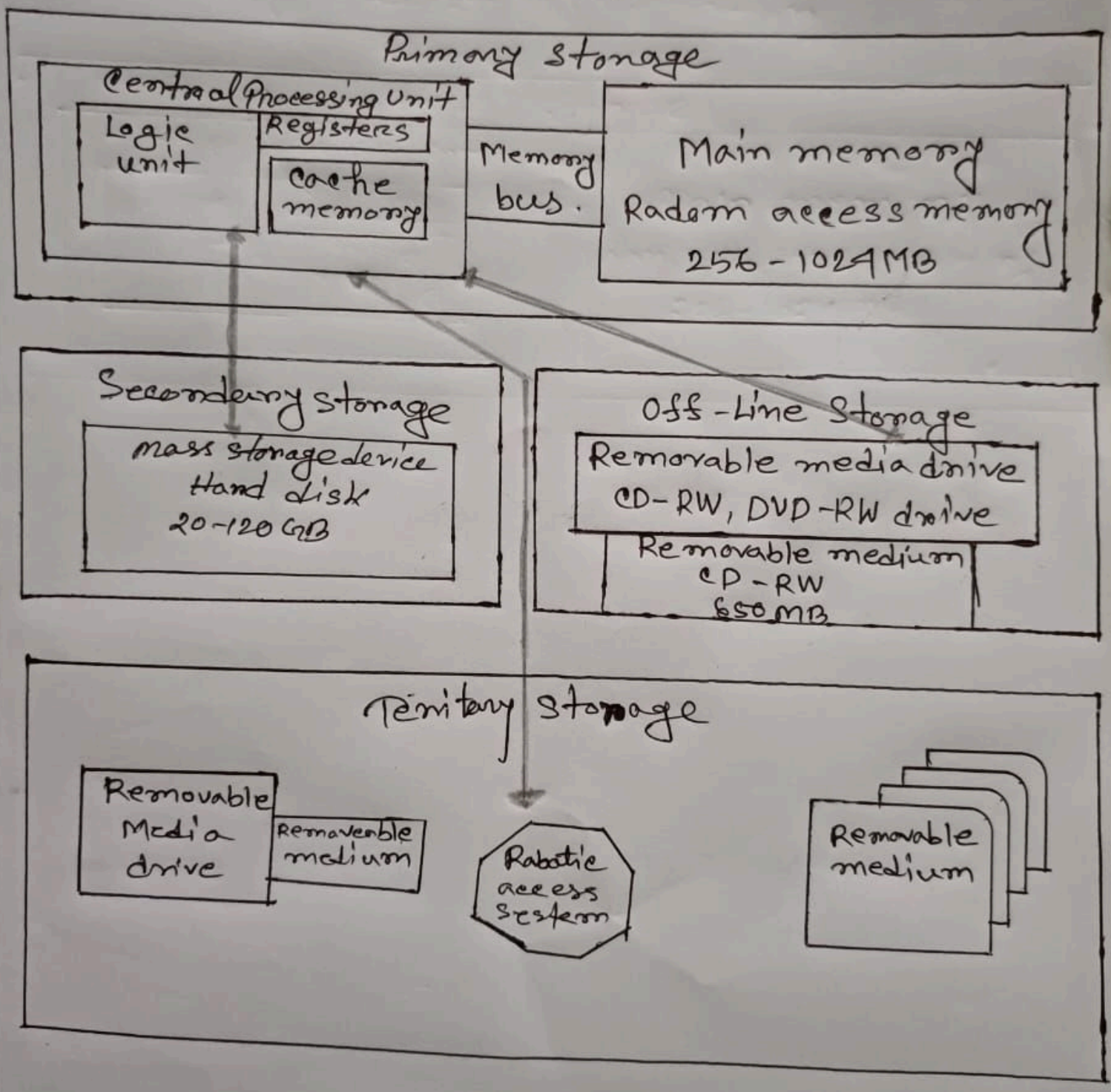
* **Full adder:** Full adder is the basic component of VLSI architecture. It is capable of performing arithmetic operations such as addition and subtraction. These digital circuits are obtained from the combination of logic gates. These systems designed with the gates are of two types either combinational or sequential.

A full adder using basic gates:



Ans to the question no-2(a)

* Memory Subsystem Organization



Answer to the Question No - 3(a)

*A Model of I/O Subsystem Organization: Input output (I/O) devices allow us to communicate with the computer system. I/O is the transfer of data between primary memory and various I/O peripherals. Input devices such as keyboards, mice, card readers, scanners, voice recognition systems, and touch screens enable us to enter data into the computer. Output devices such as monitors, printers, plotters and speakers allow us to get information from the computer. These devices are not connected directly to the CPU. Instead, there is an interface that handles the data transfers. This interface converts the system bus signals to and from a format that is acceptable to the given device. The CPU communicates to these external devices via I/O registers. We can classify input/output ports into four categories based on the CPU's ability to read and write data at a given port address. These four categories are read only ports, write only ports, read/write ports, and dual I/O ports. The I/O subsystem is also responsible

④

for protecting itself from errant processes and malicious users.

- I/O Scheduling
- Buffering
- Caching
- Spooling and devie Reservation
- Error Handling
- I/O Protection

The I/O subsystem of a computer provides an efficient mode of communication between the central system and the outside environment. It handles all the input-output operations of the computer system. Peripheral Devices. Input or output devices that are connected to computer are called peripheral devices. Input or output devices that are connected to computer are called peripheral devices. These devices are designed to read information into or out of the memory unit upon command from the CPU and are considered to be the part of computer system. This devices are also called peripherals.

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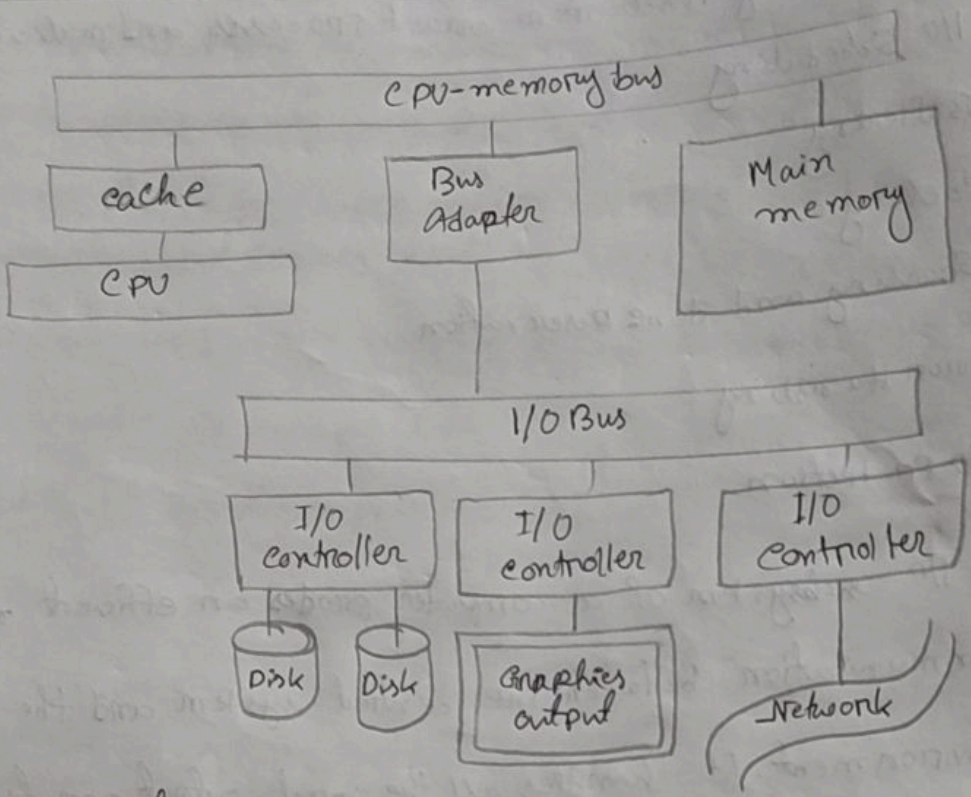
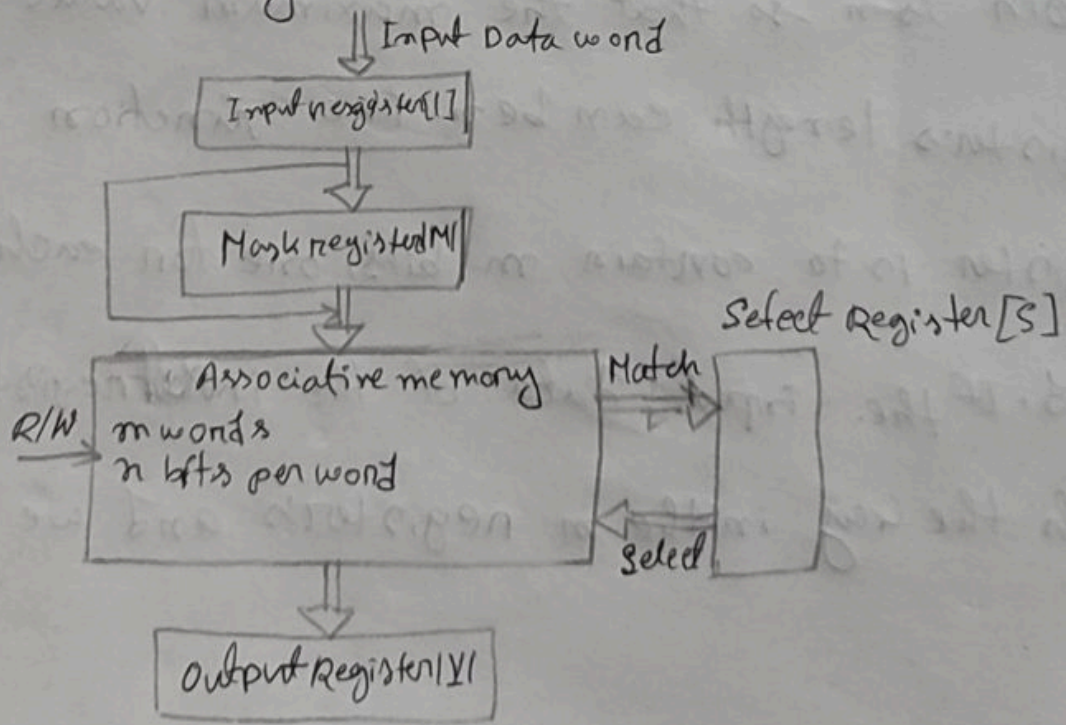


Basic components of an I/O subsystem. The I/O bus is also called a string, with the I/O controller called a string controller.

Answer to the Question NO-1(a)

* **CAM hardware Organization:** CAM or content addressable memory is a special type of computer memory used in certain very-high-speed searching applications. It is also known as associative memory or associative storage and compares input search data against a table of stored data, and returns the address of matching data.

Associative memory is a memory unit whose database can be accessed by the data or content instead of an address or memory location. It is also called content addressable memory or CAM. It helps optimize searching any data as the searching process does not in addressing, but it works on data.



(2)

The diagram shown above is a block diagram of the hardware organization of associative memory. It includes input register, mask register, select register and output register and an associative array with m words, each with n bits. The function of the input register is to hold the content that we want to write on search in the associative memory. At the moment, it can hold only one word having length let us say n. The function of the mask register is to provide a mask for selecting a specific key or field in the word of the input register. The input register can hold single word length data, where length is n so that the maximum value of the mask register's length can be n. The function of the select register is to contain m- bits, one for each memory's word. If the input data of the input register get compared with the key in the m register's and we get a match,

then that particular bit is set in the select register. The function of the output register is to contain the data word that got matched retrived from the associative memory.