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Subject: Introduction to ICT

Answer1:

Characteristic of Computer:

1. Speed:

- Computers are much faster to perform mathematical calculations than human. The computer is capable of performing millions of tasks per second.
- It takes an hour or a day for a person to do a mathematical calculation or any work, to do the same calculation or work to a computer do in microseconds or nanoseconds.

2. Accuracy:

- A computer is very accurate. It does not make any kind of mistake in calculating. Sometimes we get some error but these are because of the mistake performed by us.
- The Accuracy Of the computer is constantly high and it can perform hundred of operation with the carry-out calculation and analysis accurately and speedily.

3. Diligence:

- A person gets tired of doing some work in a few hours and a computer has the ability to do any work continuously for many hours, days, months.
- Even after the computer has worked for such a long time, there is no decrease in its ability to work and the accuracy of the result.
- The computer does work without any discrimination. A computer is free from monetary and tiredness.

4. Reliability:

- Reliability is a very big characteristics of computer. Today almost all the big industries or big e-Commerce companies like Amazon and Flipkart, and big search engine companies like - Google and Bing, all these companies are dependent on computers.
- Today every major industry and companies in the world have full confidence in their computers, and their entire business is running from computers.
- Today the work of all companies is being done through computers. These companies store all their data in the computer, the data of these companies are many types of data such as the amount to be paid, the date of payment and many other types of data, which will be used in future when the time comes for that data use.
- Data place to another place is transported through a computer in a very short time.
- The computer does all its work very honestly. Night or day, the computer continues its work without being tired. Today this is the reason why big e-commerce companies and industries blindly trust computers.

5. Versatility:

- Versatility is the Characteristics of a computer. Its means is that the computer is capable of working in almost every field.
- Today computers are being used almost everywhere like schools, colleges, hospitals, offices, railway stations, hotels etc.
- A computer system is multitasking so that you can do two tasks very easily at the same time.

6. Storage Capacity:

- Computer systems have a very large capacity to store any type of data. A computer can store and resell any information due to its storage capacity.
- Computers have the ability to store all types of data such as data, pictures, files, programs, games, and sound for many years and later we can get any data in a few seconds at any time for taking that information and for future retrieval.

7. Automatic:

- A computer is an automatic machine because once started on a job they carry on until the job is finished without any human assistance.

8. Quick Decision:

- The computer takes the decision very quickly, given by the user which is the instruction arithmetic data or logic data.
- All Mathematical data is called arithmetic data.
- Copy Document, Delete file, open camera etc this type of data is called Logical data.

9. Multitasking:

- Multitasking is also a very special feature of computers. A user can do different types of tasks on the computer at the same time.
- Like we are using MS Word in computer as well as listening to songs and also getting printouts.
- We can do a lot of work at the same time.

10. No Feeling:

- In computers, like humans, there is no feeling and emotion, nor does the computer have any knowledge and experience, because a computer is a machine which works continuously on the instruction of humans without any selfishness and without tiredness.

11. Power of Remembering:

- Power of remembering is also very special Characteristics of the computer.
- You can store many types of information and data on your computer in very large quantities. Whenever you need this data in future, you can get that data in a few seconds matter why.
- You can get the data even after a long time. It depends on you, after how long or after how many years you need the data.

12. No IQ:

- A computer is a dumb machine, without a user, a computer is a useless machine and device.
- Until a user does not give any instruction, it cannot do any work and only after completing the instruction, he completes that work very fast.
- A computer system is completely dependent on us humans how to work.
- For an example, if you want to multiply two numbers, then writing such 3 & 3, the computer will not give us any result, unless we instruct $3 * 3 =$, the computer multiplies that number and gives the result. So a computer cannot make its own decision.

Answer 2:

a) Machine Learning:

Machine learning refers to a type of data analysis that uses algorithms that learn from data. It is a type of artificial intelligence (AI) that provides systems with the ability to learn without being explicitly programmed. This enables computers to find data within data without human intervention.

What is important to know about machine learning is that data is being used to make predictions, not code. Data is dynamic so machine learning allows the system to learn and evolve with experience and the more data that is analyzed.

Supervised Versus Unsupervised Machine Learning:

Typically, machine learning is categorized as supervised or unsupervised machine learning:

Supervised Machine Learning: A pre-defined set of examples are used to reach a conclusion when given data.

Unsupervised Machine Learning: The system finds patterns and relationships in the data with no examples from which to draw conclusions.

b) 5G technology:

The new 5G mobile communications system will enable many new mobile capabilities to be realized - offering high speed, enormous capacity, IoT capability, low latency and much more it provides the bearer for many new applications.

- The 5G mobile communications system provides a far higher level of performance than the previous generations of mobile communications systems.
- The new 5G technology is not just the next version of mobile communications, evolving from 1G to 2G, 3G, 4G, but it provides a new approach giving ubiquitous connectivity.

- 5G technology is very different. Previous systems had evolved driven more by what could be done with the latest technology. The new 5G technology has been driven by specific uses and applications.
- 5G mobile communications has been driven by the need to provide ubiquitous connectivity for applications as diverse as automotive communications, remote control with haptic style feedback, huge video downloads, as well as the very low data rate applications like remote sensors and what is being termed the IoT, Internet of Things.
- 5G is able to provide much greater flexibility and therefore it is able to support a much wider range of applications, from low data rate Internet of Things requirements through to very fast data rate and very low latency applications.

c) Central processing Unit (CPU):

The central processing unit (CPU) or processor, is the unit which performs most of the processing inside a computer. It processes all instructions received by software running on the PC and by other hardware components, and acts as a powerful calculator.

The central processing unit (CPU) has two components:

- 1) Arithmetic logic unit
- 2) Control Unit

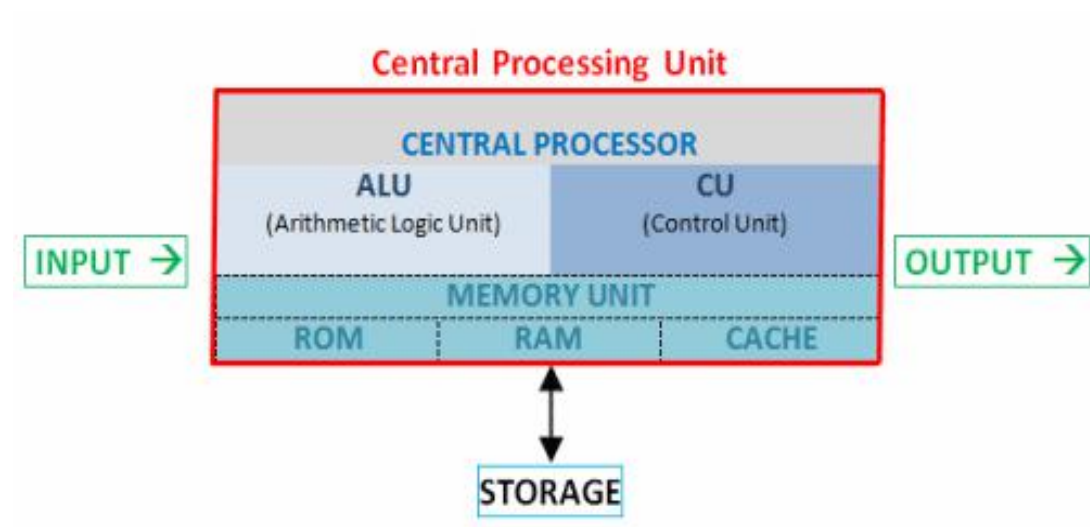
1) Arithmetic logic unit:

An arithmetic logic unit (ALU) is a digital circuit used to perform arithmetic and logic operations. It represents the fundamental building block of the central processing unit (CPU) of a computer.

2) Control Unit:

The control unit (CU) is a component of a computer's central processing unit (CPU) that directs the operation of the processor. It tells the computer's memory, arithmetic and logic unit and input and output devices how to respond to the instructions that have been sent to the processor.

Diagram:



d) Non-Positional Number:

A non-positional number system uses a limited number of symbols in which each symbol has a value. However, the position a symbol occupies in the number normally bears no relation to its value—the value of each symbol is fixed.

The roman number system is a good example of a non-positional number system. This number system has a set of symbols $S = \{I, V, X, L, C, D, M\}$.

Values of symbols in the Roman number system

Symbol	I	V	X	L	C	D	M
Value	1	5	10	50	100	500	1000

Answer 3:

(a) Convert (110101010)₂ in to ()₁₀.

$$\begin{aligned} & \cdot 2^8 + 1 \cdot 2^7 + 0 \cdot 2^6 + 1 \cdot 2^5 + 0 \cdot 2^4 + 1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 \\ & + 0 \cdot 2^0 = 1 \cdot 256 + 1 \cdot 128 + 0 \cdot 64 + 1 \cdot 32 + 0 \cdot 16 + 1 \cdot 8 \\ & + 0 \cdot 4 + 1 \cdot 2 + 0 \cdot 1 = 256 + 128 + 0 + 32 + 0 + 8 + 0 \\ & + 2 + 0 = 42610 \end{aligned}$$

Got It: $110101010_2 = 42610$

(b) Multiply binary numbers 10001010 and 10101101.

Binary value:

$$\begin{aligned} & 10001010 \times 10101101 \\ & = 0101110101000010 \end{aligned}$$

Decimal value:

$$\begin{aligned} & 138 \times 173 \\ & = 23874 \end{aligned}$$