

Q5) a) Distinguish between RAM and ROM. Also define Nibble and USB.

Ans) Difference between RAM and ROM

RAM

- RAM stands for "Random Access Memory."
- RAM is volatile memory that temporarily stores files that you are working on. It is used in normal operations.
- RAM stores data in MBS.
- Writing data in RAM is faster.
- It has large size with higher capacity.

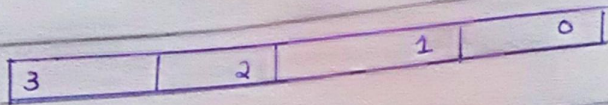
ROM

- ROM stands for "Read Only Memory."
- ROM is non-volatile memory that permanently stores instructions on the computer. It is used in startup process.
- ROM stores data in GBs.
- Writing data in ROM is slower.
- It has small size with less capacity.

Nibble :-

Definition :-

A nibble is a collection of four bits. It is the second smallest unit of information for data transmission and storage. It corresponds to half of a byte, thus four bits.



USB

Definition :-

USB stands for "Universal Serial Bus". It is an industry standard that allows data exchange and delivery of power between many various types of electronics, such as personal computers, printers, cameras, scanners etc. It supports upto 12 Mbps transfer rate.

How AI has revolutionized the world. Justify.

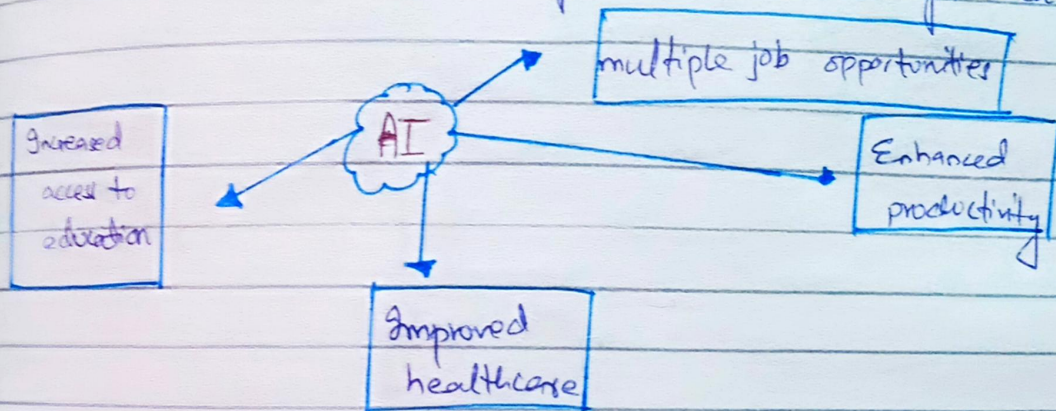
AI — The New Changing World :-

AI stands for "Artificial Intelligence". It is the intelligence of machines or softwares, as opposed to the intelligence of humans or animals. It is a field of study in computer

Science that develops and studies intelligent machines, called AIs. In short, it is the science of making machines that can think like humans. It can do things that are considered "smart". AI is a new world in itself. It has tremendously revolutionized the world.

AI and the revolution

AI has the potential to bring about numerous ^{positive} changes in society, such as:-



How AI has revolutionized the world with its advantages. AI has the ability to learn from its experience, make decisions and perform tasks that typically require human intelligence. It has greatly revolutionized the world by providing benefits and positive impacts upon society. It has brought several advantages with it like:-

- increased efficiency and productivity.
- Improved accuracy and decision making.

- Enhanced customer experience
- Creation of new jobs
- revolutionized the industries
- digitalization of society etc.

Q) How does an optical fiber work. write some of its advantages.

Ans) Working process of optical fiber :-

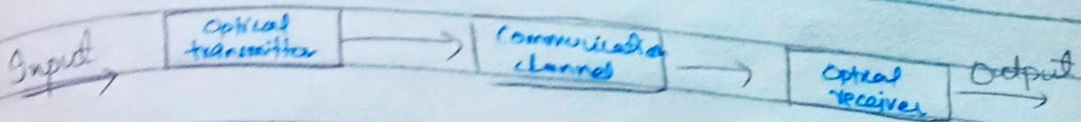
Optical fiber :- Fiber optics or optical fibers are long thin strands of carefully drawn glass about the diameter of a human hair. These strands are arranged in bundles called fiber optic cables. We rely on them to transmit light signals over long distances.

Working :- Light travels down a fiber optic cable by bouncing off the walls of the cable repeatedly. Each light particle (photon) bounces down the pipe with continued internal mirror like reflection. The light ~~reflected~~ beam travels down the core of the cable. The core is the middle of the cable and the glass structure. The cladding is another layer of glass wrapped around the core. Cladding is there to

d)

Ans)

keep the light signals inside the core.



ADVANTAGES OF OPTICAL FIBER:

Optical fiber

- ① Greater bandwidth
- ② Faster speed
- ③ Cheap
- ④ Thinner and light-weighted
- ⑤ Higher carrying capacity
- ⑥ Less signal degradation
- ⑦ Light signals
- ⑧ Long lifespan.

Q) What is critical speed of a satellite, differentiate geo-stationary and polar satellites.

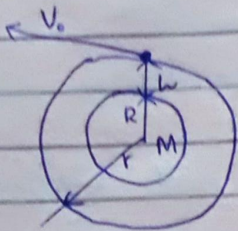
Critical speed of a satellite :-

Critical speed, also known as critical velocity is defined as the minimum velocity required to put the motion of a satellite in a stable circular orbit around any celestial object. It is also known as "orbital velocity".

Denoted:- It can be denoted as " v_c or " v_o ".

Derivation:

It can be derived as the minimum centripetal force needed to bind the satellite in a circular orbit under the gravitational field.



$$\text{critical velocity/speed} = v_c = \sqrt{\frac{GM}{r}}$$

Difference between geo-stationary and polar satellites.

Geo-stationary

- ① A satellite in a circular orbit around the earth in a equatorial plane.
- ② Appears to be stationary.
- ③ Used for communication purpose.
- ④ Example include: Communication satellite

Polar

- ① Polar satellite is that whose angle of inclination with equatorial plane of earth is 90° .
- ② Does not appear to be stationary.
- ③ It is used for spying.
- ④ e.g. earth observation and monitoring satellite

Q6) a) Five years ago, age of father was three times the age of son, if son is 30 years now, what is current age of father.

Solution:-

Let Present age be :-

$$\text{Father} = x$$

$$\text{Son} = y = 30$$

And Past age

$$\text{Father} = x - 5$$

$$\text{Son} = y - 5 = 30 - 5 = 25$$

Now

$$x - 5 = 3(y - 5)$$

$$x - 5 = 3(25)$$

$$x = 75 + 5$$

$$x = 80 \text{ years} \rightarrow \text{Ans.}$$

6) Mean of 10, 30, Y and 50 is 50. what is value of Y.

Solution . Mean = $\frac{\text{sum of observations}}{\text{no. of observations}}$

$$\text{Mean} = \frac{10 + 30 + Y + 50}{4} = 50$$

$$\text{Mean} = \frac{90 + Y}{4} = 50$$

$$\text{Mean} = 90 + Y = 50 \times 4$$

$$90 + Y = 200$$

$$Y = 200 - 90$$

$$Y = 110 \rightarrow \text{Ans.}$$

(c) find the missing term-

(i) 2, 6, 18, 54, _____

Solution,

2, 6, 18, 54, 162 →

It is a simple multiplication series where each next number is obtained by multiplying the previous digit with 3.

(ii) 3125, 256, _____, 4, 1

Solution,

3125, 256, 27, 4, 1

The following series is a sequence of $5^5, 4^4, 3^3, 2^2, 1^1$, therefore the missing number is cube of 3 i.e. 27.