

General Science And Ability "

QNO.5

(a)

Difference between RAM and ROM :

1) RAM

a) Abbreviation, RAM stands for ~~Read~~ Random Access Memory.

b) Temporary Memory, RAM is a temporary type of computer memory. The data stored in RAM can be deleted very easily.

c) Volatile Memory :

RAM is also known as 'Volatile Memory' of the computer which means data stored in RAM gets deleted when power is turned off if the data is not saved by the user.

d) Expensive Memory.

RAM is an expensive memory of the computer.

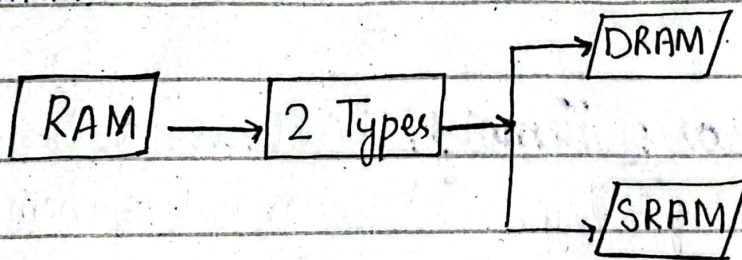
e) Read and write function:

RAM

has ability to perform both Read and write functions.

f) Types:

There are two types of RAM.



2) ROM:

a) Abbreviation:

ROM stands for Read Only Memory.

b) Permanent Memory:

ROM is known as permanent memory of the computer. It stores data

permanently.
c) Non-Volatile Memory:

ROM
is also known as Non-volatile Memory because data stored in ROM does not get deleted if the power turns off.

d) Inexpensive Memory:

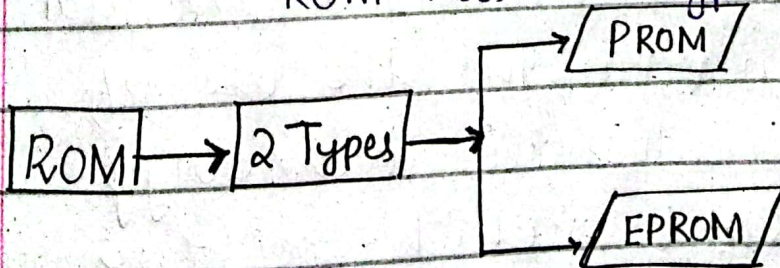
ROM is considered relatively inexpensive and cheap as compared to RAM.

e) Read only function:

ROM performs only Read functions. It cannot perform Write functions.

f) Types:

ROM has two types:



Nibble

Nibble is a memory

unit which contains 4 bits.

1 Nibble = 4 Bits

USB

USB stands for Universal Serial Bus. This bus is used to transfer data in computer.

USBs are also used to store data depending on their memory.

(b)

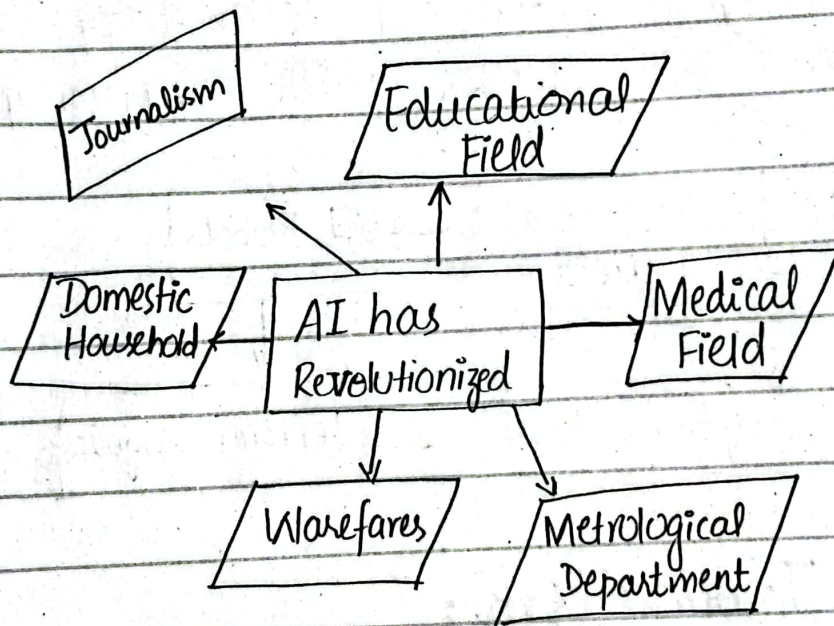
AI has revolutionized the world:

Artificial Intelligence:

Artificial Intelligence involves the use of highly advanced technology and Robots which perform tasks which are performed by human beings.

How AI has revolutionized the world:

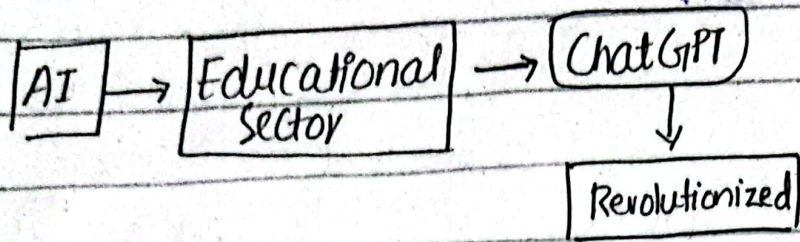
On the basis of the efficiency it is fair enough to say that Artificial Intelligence has revolutionized the world. AI has dominated many fields today and has wide applications as discussed below:



a) Educational fields

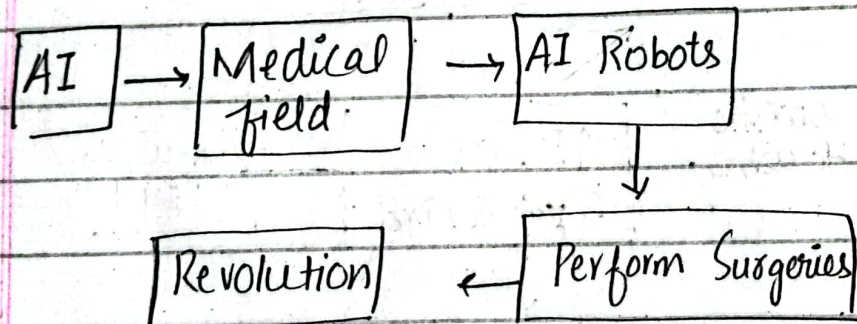
AI has revolutionized educational field by providing students and teachers various platforms which can help them study more

efficiently and accuracy.



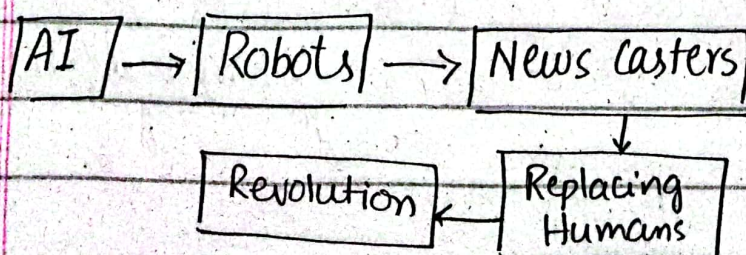
b) Medical Field:

AI has also revolutionized medical field by bringing advanced technology to do tasks with efficiency.



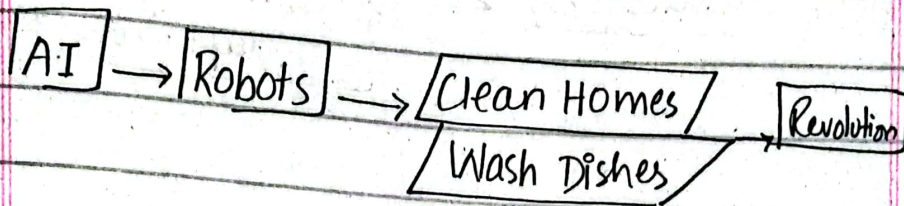
c) Journalism:

AI has also brought revolution in the field of journalism and newscasting departments.



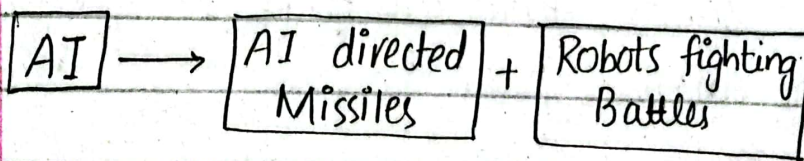
d) Domestic households:

AI is also revolutionizing domestic households as people are using AI robots to do domestic chores.



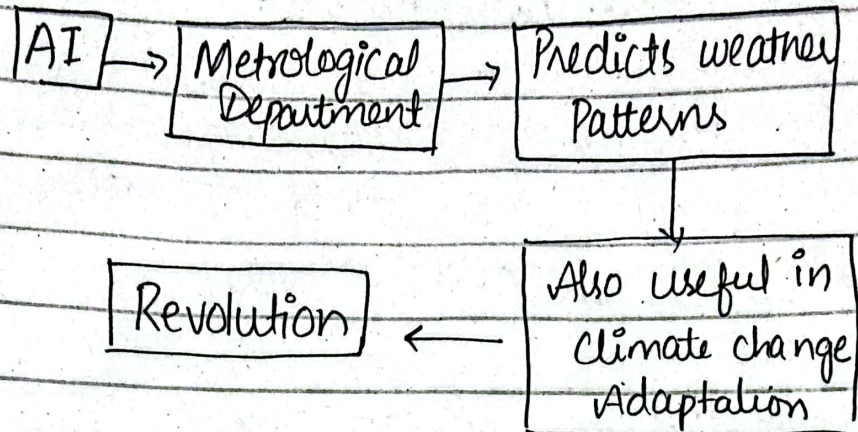
e) Warefare and AI:

AI is now being used in ware fields as well. Now instead of bearing loss of human lives, AI related devices like Robots are ready to fight battles.



f) Metrological Department:

Metrological department is also using AI to predict the weather patterns and to prepare before disasters.



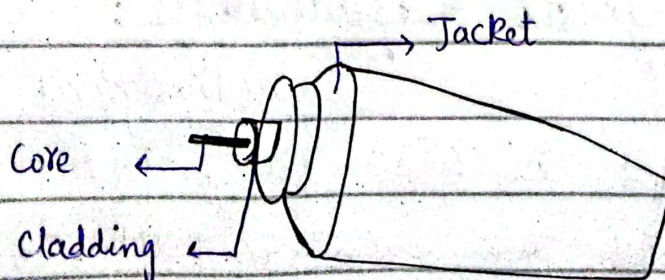
(C)

Optical Fiber

Definition:

"Optical fibers are the strands of the glass which are used to transfer light signals from one place to another place."

Parts of Optical fiber:



Working of Optical fiber:

Working Principle: Working Principle of optical fiber is Total Internal Reflection.

Conditions for Total Internal Reflection:

i) Light should travel from rare to denser medium

ii) Angle of incidence should be greater than critical angle. ($\alpha_{inc} > \alpha_{crit}$)

Critical Angle:

Angle of incidence for which angle of refraction becomes 90° .

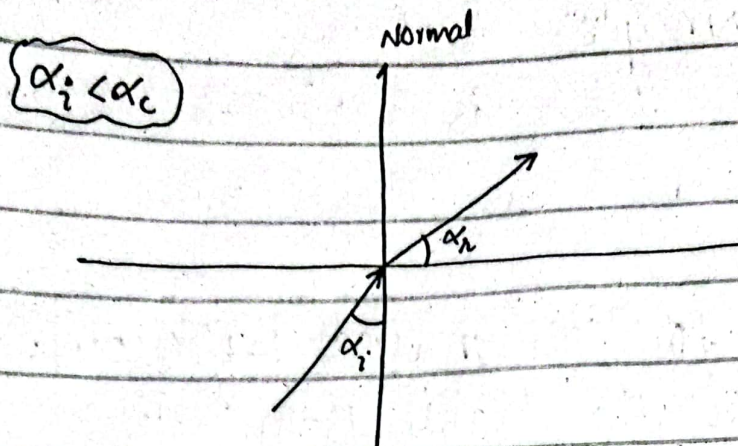
Explanation:

Let us consider a beam of light entering from rare to denser medium.

a) $\alpha_i < \alpha_c$:

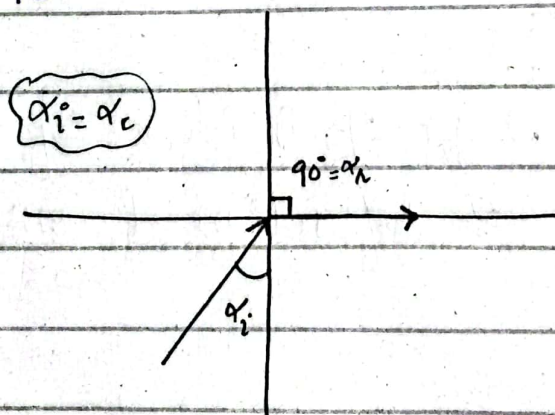
When angle of incidence is less than critical

angle then refracted ray move away from the normal.



b) $\alpha_i = \alpha_c$

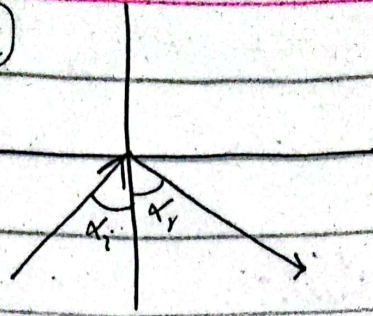
When angle of incidence is equal to critical angle then light refracts at 90° .



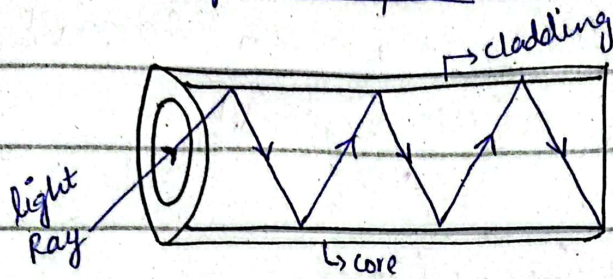
c) $\alpha_i > \alpha_c$

In this case total internal reflection takes place. Glass Air boundary will behave as a mirror and no refraction takes place. So total light will be reflected back into the same medium.

$$\alpha_i > \alpha_c$$

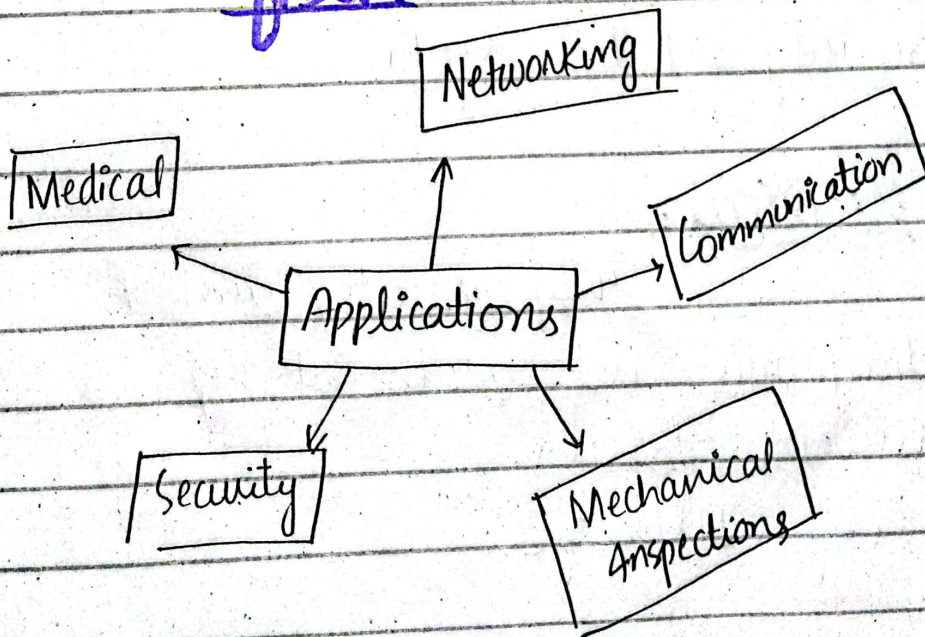


An optical fiber:



This is how the transmission of light signals takes place through optical fiber.

Applications of Optical fiber:



a) Networking:

Optical fibers are

used to connect computers to share data quickly.

b) Communication:

Optical fibers are used for telecommunication (to send and receive light signals).

c) Mechanical Inspection:

Engineers use it to detect damages and faults.

d) Security:

They are used in various security detection systems.

e) Medical:

They are also used for diagnostic and treatment of various diseases.

e.g Endoscope

(d)

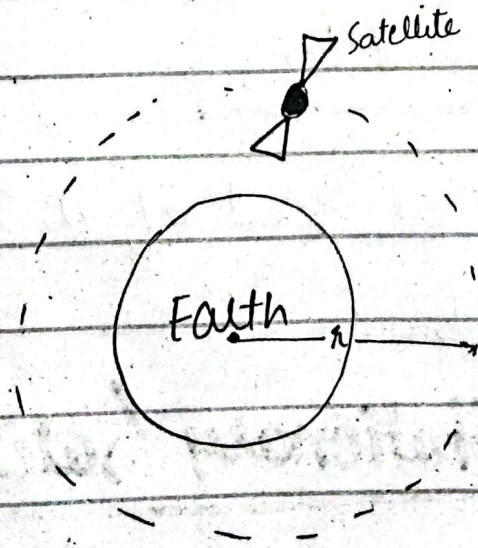
Critical Speed of a Satellite

Definition:

"The minimum speed required to put a satellite in an orbit around the sun is called Critical Speed."

Calculation:

Let us consider a satellite that is launched from the ground. The satellite is being put in an orbit around the earth.



Two forces are acting on the satellite:

(i) Centripetal force F_c : To keep the satellite into the orbit

(ii) Gravitational force F_g : This provides necessary F_c to keep satellite in the orbit.

Both forces are balanced.

$$F_c = F_g$$

$$\frac{mv^2}{r} = mg$$

$$v = \sqrt{gr}$$

$$g = 9.8 \text{ m/s}^2$$

r = radius of earth

$$r = 6400 \text{ km}$$

$$v = \sqrt{(9.8)(6400)}$$

$$v = 7.9 \text{ km/s}$$

So the critical speed of a satellite is 7.9 km/s.

Geo-Stationary Satellite

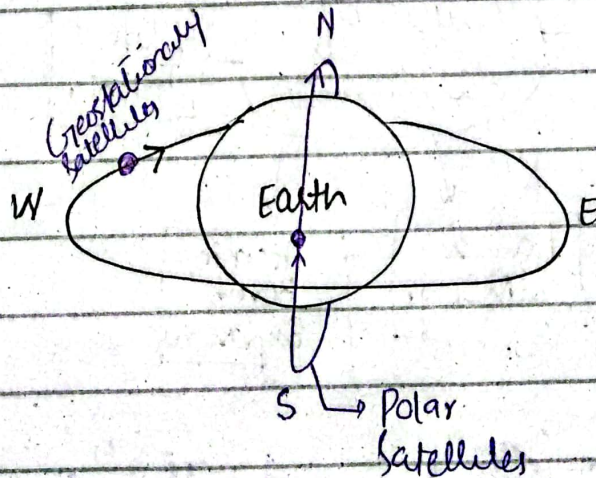
- A satellite in which its motion is synchronized with the spin

motion of the earth.

- These satellites move from West to East due to anticlockwise motion of the earth.
- low orbit satellite • Altitude = 200-2000 Km

Polar Satellites

- These satellites move from North to the South pole.
- They are less used because of less population living at these poles.
- Altitude = 3600 Km



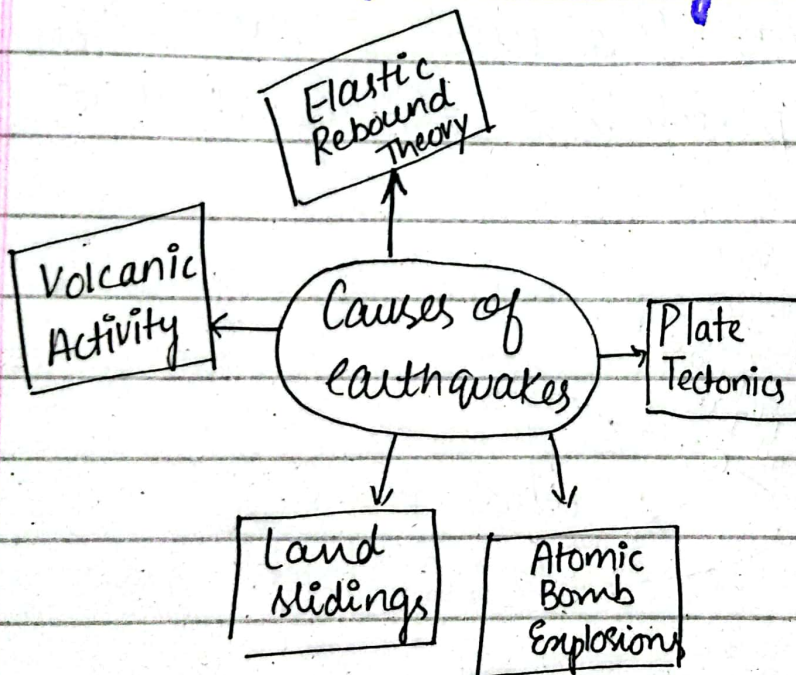
Q No. 4

(a)

Earthquakes:

Definition: "Sudden shaking or Rolling of earth surface is called Earthquake."

How earthquakes are generated:

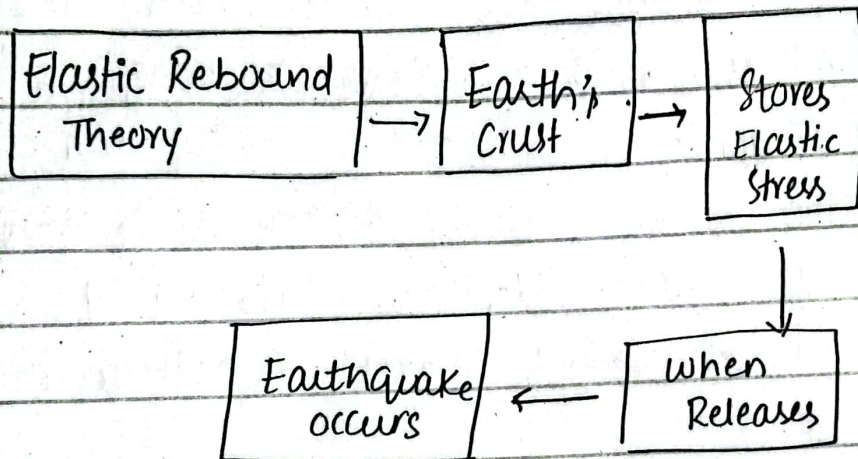


a) Elastic Rebound Theory:

This theory was given in 1906 by Fielding Reid and the concept is based

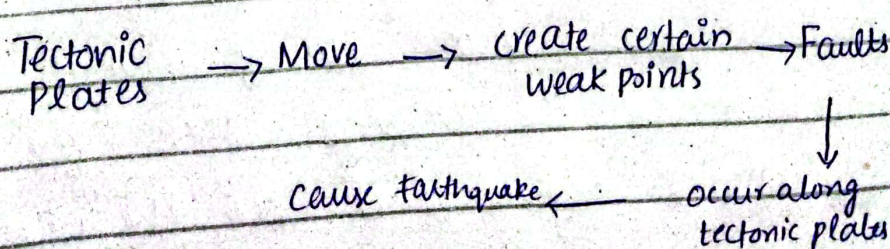
upon the elasticity of a rubber band which releases its stored elasticity when it is cut down.

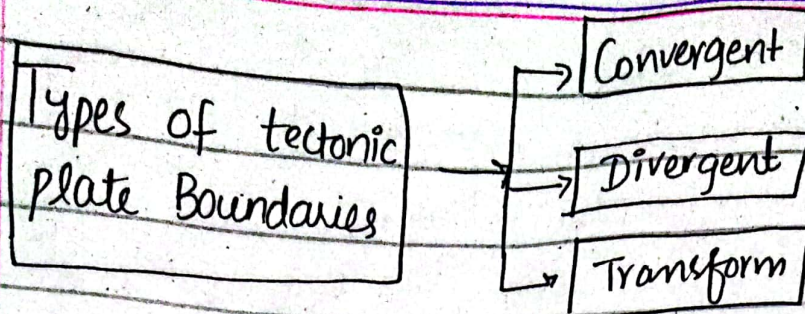
Similarly crust of the earth gradually stores elastic stress that is released as earthquakes are occurred.



b) Plate Tectonics

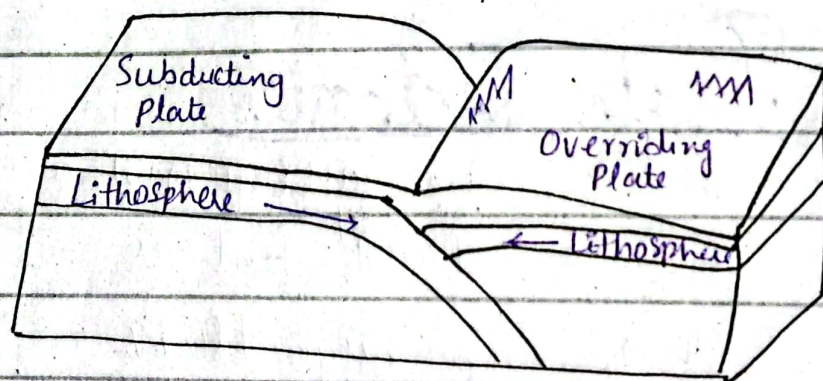
"Crust of the earth is not a uniform ^{shell} block but is made up huge blocks that fit together called Tectonic Plates."





(i) Convergent Boundaries:

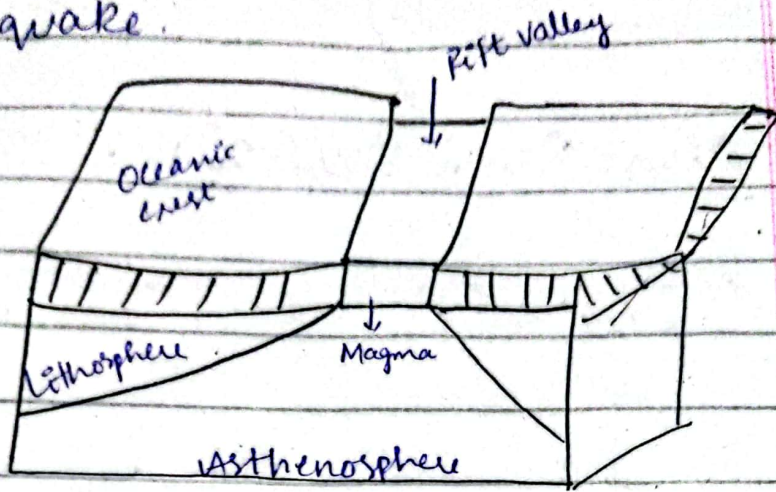
In this phenomenon, two tectonic plates come together and converge. During convergence one plate slides over other plate. The denser plate goes under less denser plate and bounces and causes earthquake.



(ii) Divergent Boundaries:

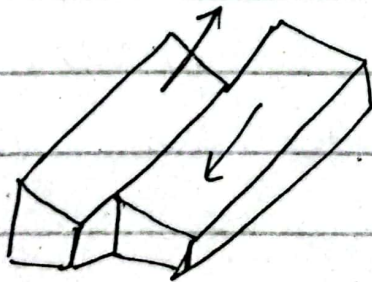
When two tectonic plates move away from each other i.e Diverge then new crust is generated as the plates

move away from each other.
This spread of plates also causes
earthquake.



(iii) Transform Plates.

When two plates
move past one another (plates
move horizontally) earthquake
occurs.



(c) Volcanic Activity:

Volcanic

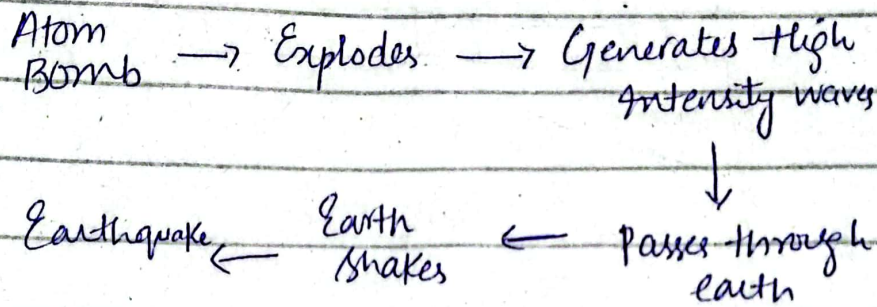
Activity also causes earthquakes.

Magma Rises → Pushes Apart → Tectonic Plates → Earthquake.

d) Land Sliding:

When land sliding occurs it also causes earthquake.

e) Atom Bomb Explosions:



Tsunami

→ A Tsunami is a series of large ocean waves caused by the displacement of water, typically due to underwater geological or geographical events.

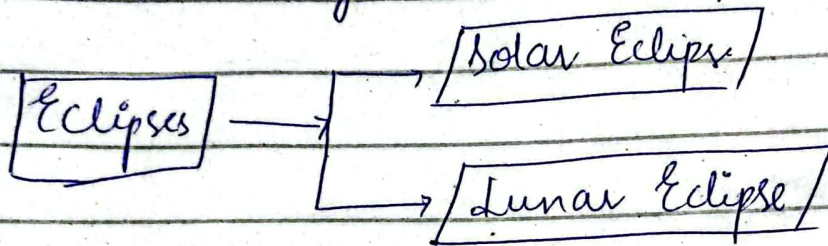
→ Earthquakes can also cause Tsunami.

→ As many earthquakes in Japan also give rise to Tsunami.

(c)

Solar Eclipse :

Eclipse : An astronomical event that occurs when one celestial body partially or totally covers another celestial body called Eclipse.



Solar Eclipse

“ When moon while moving around the sun and earth comes directly between the sun and earth then it causes solar Eclipse. ”

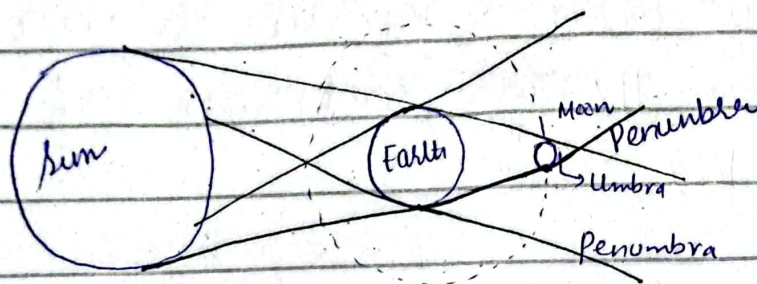
- Moon and sun appear the same size as viewed from the earth.
- Sunlight do not reach earth completely but reflected back

too small to cover the entire Sun's disk because moon's orbit is not perfectly round

too small to cover the entire Sun's disk because moon's orbit is not perfectly round. Because moon's orbit is not perfectly round rather

Lunar Eclipse:

During motion when earth comes between moon and the sun and casts its shadow on the moon, then this phenomenon is called 'Lunar Eclipse'.



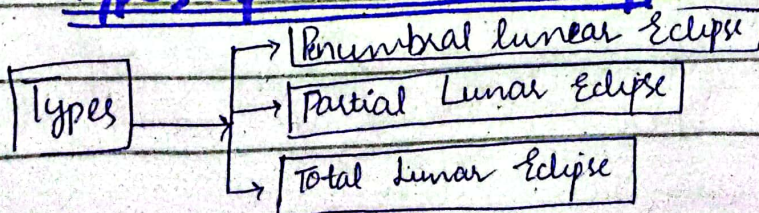
i) Umbra:

It is darker zone of earth's shadow where it blocks all direct sunlight from reaching the moon.

ii) Penumbra:

It is lighter zone of earth's shadow where it blocks only a part of sunlight from reaching the moon.

Types of Lunar Eclipse:



(i) Penumbral Lunar Eclipse:

This eclipse occurs when moon passes through Earth's penumbral shadow.

(ii) Partial Lunar Eclipse:

This eclipse occurs when a portion of moon passes through earth's umbral shadow.

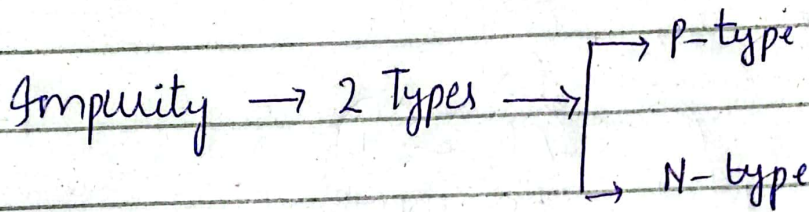
(iii) Total Lunar Eclipse:

This eclipse occurs when entire moon passes through earth's umbral region.

QNO. 4 (d)

Doping in semi conductors:

"A process of adding impurity in a pure semiconductor is called Doping of a semiconductor."



P-Type Semiconductors

When a pure semiconductor is doped with an impurity atom from the ~~fourth~~^{third} group of the periodic table then doped semiconductor is known as P-Type Semiconductor.

N-Type Semiconductor:

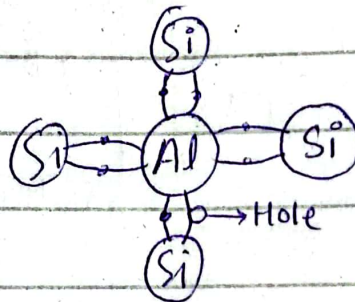
When a pure semiconductor is doped with

an impurity atom from ~~third~~^{fifth} group of the periodic table then this semiconductor is known as N-type semiconductor.

Examples:

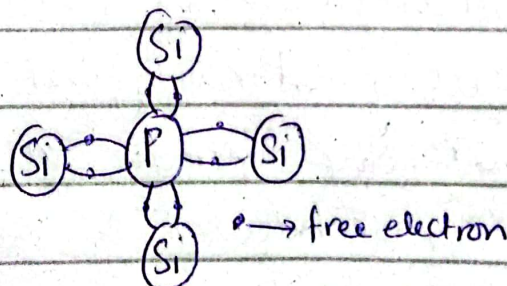
P-Type

Boron, Gallium, Indium
Alluminium



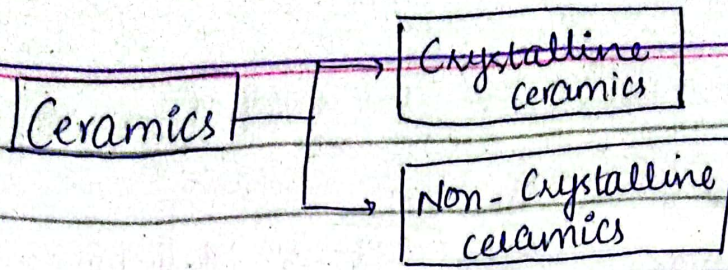
N-Type

Arsenic, Phosphorous, Antimony



Types of Ceramics

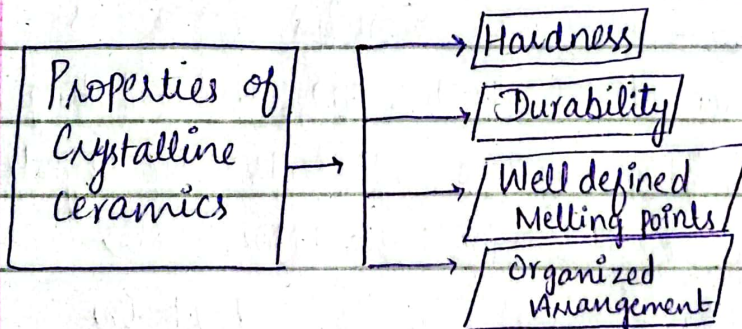
There are two major types of ceramics:



i) Crystalline Ceramics

“Ceramics having highly ordered atomic structure with a repeating pattern are called Crystalline ceramics.”

Properties

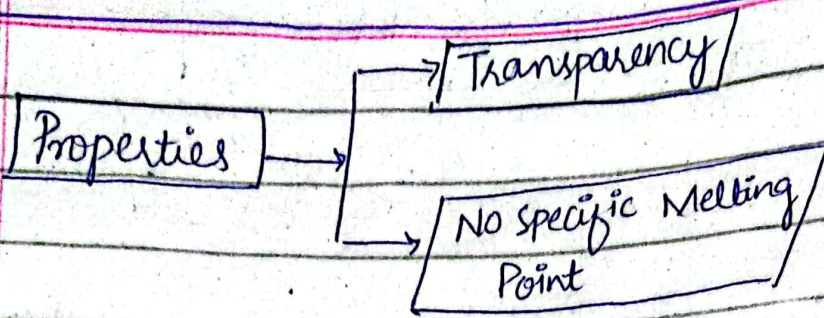


Examples

Quartz and Diamond.

ii) Non-Crystalline Ceramics

“Ceramics not having a well defined and ordered atomic structure are called Non-Crystalline ceramics.”



Examples :

Glass is a common example of non-crystalline ceramics.

(b)

Coriolis Force:

Coriolis force is a force that acts on the rotating objects. This force deflects the objects to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

This force is a result of the Earth's rotation and is responsible for the rotation direction of large scale weather systems.

Hurricane formation:

A hurricane is a large, powerful tropical cyclone characterised by strong winds and heavy rain.

They are formed from the following sources:

(i) Warm water of oceans:

Hurricanes typically form over warm ocean waters (at least 26.5°C). The warm water provides energy needed for their development.

(ii) Low Pressure:

A pre existing weather disturbance like a cluster of thunder storms, creates a low pressure area. Warm air over the ocean's surface rises, creating a low pressure system and giving rise to hurricane.

(iii) Coriolis Effect:

As the earth rotates

the Coriolis forces causes the developing storm system to start spinning.

Northern Hemisphere → Hurricane spin counterclockwise

Southern Hemisphere → Hurricane spin clockwise

(iv) Eye Formation

As the system gains strength, an eye forms at the center. The eye is a region of calm with low pressure. This region give rise to hurricane.

Section II

QNO.6

(a)

Present age of son = 30 years

Present age of father = ?

Let present age of ~~son~~^{father} = x

According to given details, five years ago the age of father

$$x - 5 = 3(\text{age of son}) \rightarrow (1)$$

Age of son 5 years ago = $30 - 5 = 25$

$$(1) \Rightarrow x - 5 = 3(25)$$

$$x - 5 = 75$$

$$x = 80$$

So Present age of father = 80 years.

(b)

Mean of 10, 30, y , 50 = 50

$$\frac{10 + 30 + y + 50}{4} = 50$$

$$y + 90 = 200$$

$$y = 110$$

(C)

(i) 2, 6, 18, 54, —

$$2 \times 3 = 6$$

$$6 \times 3 = 18$$

$$18 \times 3 = 54$$

$$54 \times 3 = 162$$

So 2, 6, 18, 54, 162

(ii) 3125, 256, —, 4, 1

(d)

Let two numbers are = x and y

Product of two numbers = 320

$$xy = 320 \rightarrow (1)$$

Ratio of two numbers

$$x : y = 1 : 5$$

$$\frac{x}{y} = \frac{1}{5} \rightarrow (2)$$

$$x^2 - y^2 = ?$$

2) =

$$x = \frac{y}{5}$$

Put in (1)

$$\left(\frac{y}{5}\right)(y) = 320$$

$$y^2 = 1600 \Rightarrow y = 40$$

Now

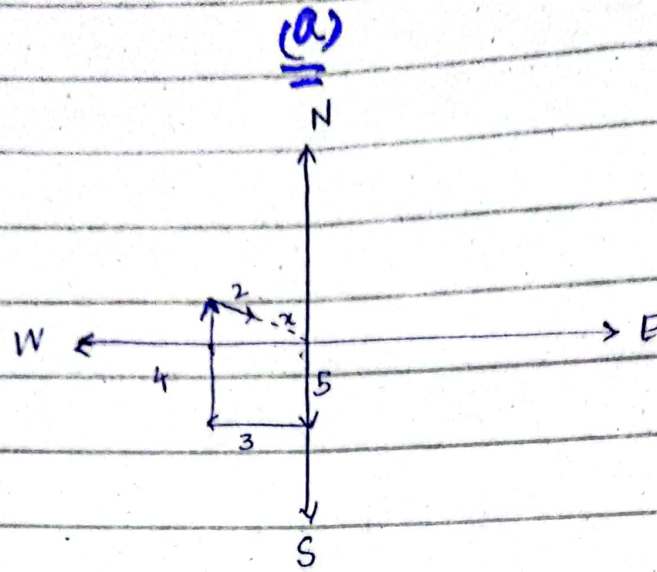
$$x = \frac{40}{5}$$

$$\Rightarrow x = 8$$

$$x^2 - y^2 = 8^2 - 1600$$

$$|x^2 - y^2| = 1536$$

QNO8 :



we have triangle 1

Using Pathagoras Theoram:

$$(x+2)^2 = (1)^2 + (3)^2$$

$$x^2 + 4 + 4x = 1 + 9$$

$$x^2 + 4 + 4x = 10$$

$$x^2 + 4x = 6$$

$$x^2 + 4x - 6 = 0$$

Using Quadratic Formula:

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(-6)}}{2}$$

$$x = \frac{-4 \pm \sqrt{16 + 24}}{2}$$

$$x = \frac{-4 + 40}{2}$$

$$x = \frac{-4 - 40}{2} \text{ (ignore)}$$

$$x = 36/2 \Rightarrow$$

$$x = 18 \text{ km}$$

Crow is 18 km away from starting point.

(b)

Total slices of Pizza = 8

Raisin slices = 3

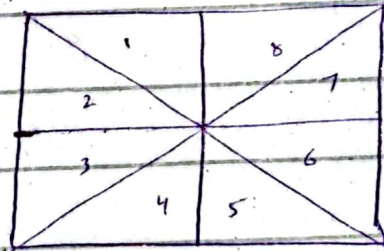
Probability of raisin = ?

$$P(\text{raisin}) = \frac{\text{No. of raisin slices}}{\text{total slices}}$$

$$= \frac{3}{8}$$

So the probability that Shiza picks a raisin slice is $\frac{3}{8}$.

(c)



No. of triangles = 14

(d)

Factors affecting IQ.

- (i) Age of the person
- (ii) Creative Thinking
- (iii) Knowledge