# Part : II

### Question : 3

**a)** what is a cyclone? In which part of cyclone winds are the strongest and destructive?

## Answer

**1-** # Causes of Cyclone:

Two things play very important role in the formation of a cyclone:

**i)** ## Pressure Gradient:

When water evaporates, it goes into the upper atmosphere. Here, gas particles are at low pressure, as a result, they liquified and condensation occurs. Heat of condensation is released and absorbed by the surroundin air i.e., rising air. Consequently, pressure increases outside and pressure gap is created. High pressure air (rushing air) rushes in order to fill the gap. This change of

**b)**

pressure is called pressure gradient.
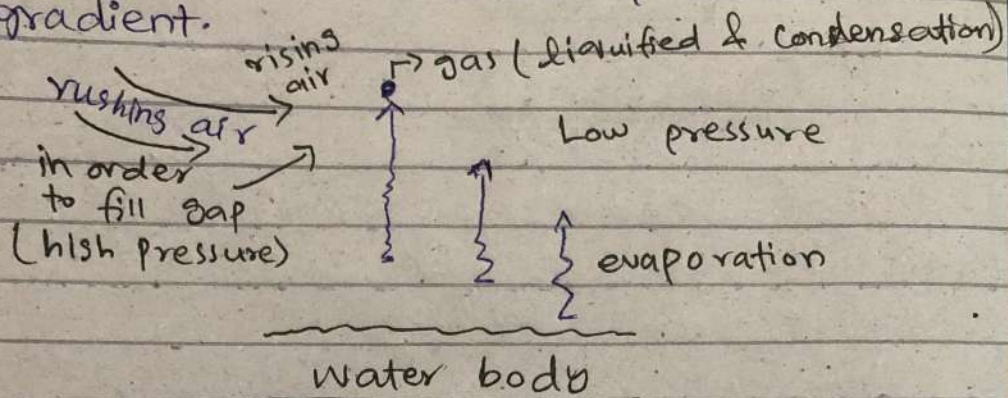


**ii) Coriolis Effect:**

**c)**

A force which tends to move the object to the right in northern hemisphere and to the left in the Southern hemisphere due to the spin motion of the earth is known as Coriolis force and this effect is called Coriolis effect.

**a) Origin of Coriolis Effect:**

As, Earth rotates faster at the equator and slower near the poles. This is because the rate of change in the diameter of the earth's latitude increases near the poles. This earth's rotation is the main cause for Coriolis effect. Coriolis force is analogus to that

of centrifugal force.

When this Coriolis effect of spin motion of the earth is coupled with the pressure gradient, then the resulting phenomena is termed as cyclone.



N
Northern Hemisphere
Coriolis force
W
Earth
E
Coriolis force
S
Southern Hemisphere
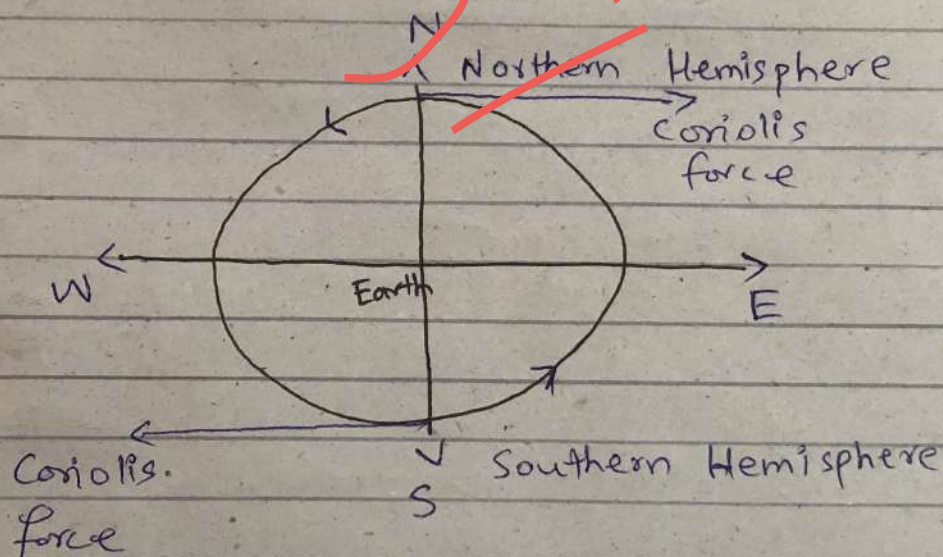
## 2- <u>Part of Cyclone where winds are Strongest :</u>

The most strongest and destructive part of a cyclone is the eyewall. Winds are strongest here with speed greater than 74 mph. At such high speed, cyclones formed

are termed as hurricane.

135

**b)**

What are shallow focus and deep focus? What causes earthquake? What was the magnitude of earthquake in Morocco recently?

## Answer

### 1) Shallow Focus:

The type of earthquake in which the depth of the origin is less than 60 km is called Shallow focus earthquake.

### 2) Deep Focus:

The type of earthquake in which the depth of origin is greater than 300 km is called deep focus earthquake.

### 3) Causes of Earthquake:

A theory 'Plate Tectonics' explained the causes of earthquake. According to this theory:

"There are certain major

... due to

and minor plates inside the internal structure of the Earth, when these plates move, Earthquake triggered."

## a) Movement of Tectonic Plates

Main driving force responsible for the movement of tectonic plate is gravity. When a plate in oceanic lithosphere meets another plate then the densed plate drags rest of the plates, this process is called subduction. Furthermore, currents of magma also contribute in the movement of these tectonic plates. As a result, earthquake triggers.

## b) Other Causes:

Earthquake may also be caused by volcanic eruption, heavy drilling, nuclear experiments, etc.

Elastic Rebound theory

## 4) Magnitude of Earthquake in Morocco:

The magnitude of Earthquake, triggered in Morocco in September 2023, was 6.8.

## c)

Write a note of Dengue fever. What are the primary causes of Dengue fever, and what preventive measures can be taken to avoid dengue infection?

## Answer

### 1- Dengue Fever:

An acute infectious disease that is characterized by headache, joint pain and rash and that is caused by a single-stranded RNA virus of the genus Flavivirus transmitted by mosquitoes of the genus Aedes, is known as Dengue fever.

### A) Other Names:

It is also called Breakbone fever, dandy fever or dengue fever.

**B)** **Case Study:**

     The Severe Dengue was first recognized in the 1950s during Dengue epidemics in the Philippines and Thailand. The typical mosquito also transmits chikungunya, yellow fever and Zika infection.

**2)** **Primary Causes:**

     The viruses that cause Dengue fever are spread by mosquitoes of the species Aedes aegypti and sometimes also by Aedes albopictus. Aedes mosquitoes are usually found in urban and suburban areas as they like to breed in man-mad containers like tires, flowerpots and household water. Aedes albopictus mosquitoes have been transported to North America and Europe by Asian products like used tires and lucky-bamboo. These mosquitoes can survive sub-freezing temperatures, which has allowed Dengue to

spread to cooler climates.

**3) Preventive Measures:**

**a) Environmental Management:**

By environmental management and modification, mosquitoes can be prevented from accessing egg-laying habitats.

**b) Solid Waste Management:**

Disposing of solid-waste properly and removing artificial man-made habitats can prevent spreading Dengue fever.

**c) Household Protection**

Use of personal household protection such as window screens, long-sleeved clothes, insecticide treated materials, coils and vaporizers can also be of valuable importance.
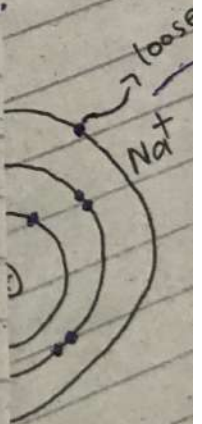
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## d) Active monitoring and Surveillance:

Active monitoring and Surveillance of vectors should be carried out to determine effectiveness of control interventions.

**d)**

Distinguish ionic and covalent bonds with examples.

## Answer

### 1- Ionic Bond

A chemical bond which is formed by the complete transfer of electron from one atom to another atom is called ionic bond.

### A) Explanation with Example

In order to explain the ionic bond, lets consider the example of table salt i.e. Sodium Chloride (NaCl).

In NaCl, Sodium (Na) has only one electron in its outermost shell whereas Chlorine atom has 7 electrons in its outer most shell. In order to attain stability, Sodium atom will loose its outer

most electron and becomes stable, where as, chlorine atom will accept this electron shared by sodium atom to complete its octet. Therefore, a bond is formed between sodium and chlorine atom by complet transfer of electron. This bond is called ionic bond.
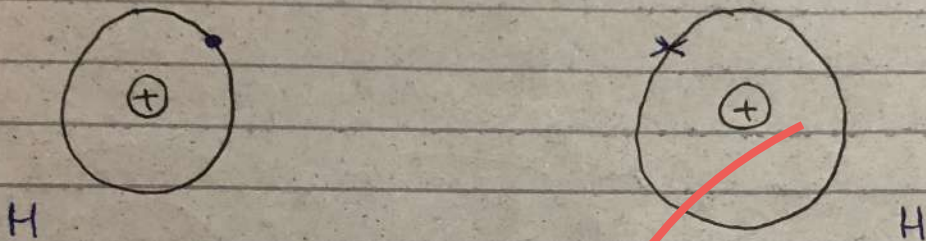
loose this $\bar{e}$

$Na^+$

$Cl$ accepts $= C\bar{l}$

Na $(Z=11)$

Cl $(Z=17)$
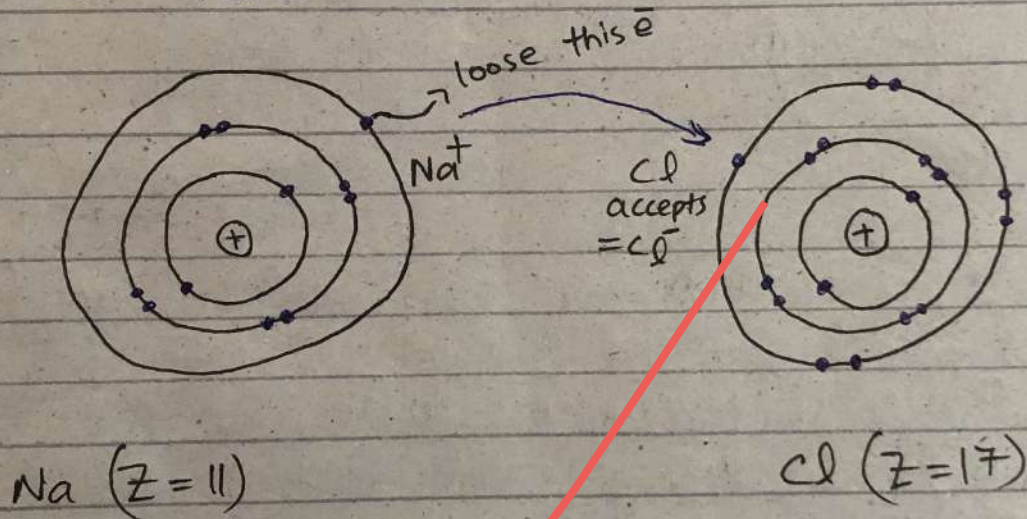
## 2- Covalent Bond

A chemical bond which is formed by mutual sharing s of electron between the atoms is called covalent bond.

# A) Explanation with Example

Consider hydrogen gas ($H_2$). Hydrogen having atomic number 1 means that it has 1-proton and 1-electron.



H

H

Hydrogen gas forms the simplest covalent bond in the diatomic hydrogen molecule. For attaining the nearest noble gas electronic configuration, each hydrogen atom shares its valence electron with other hydrogen atom and form a covalent bond in hydrogen molecule.



$H - H$

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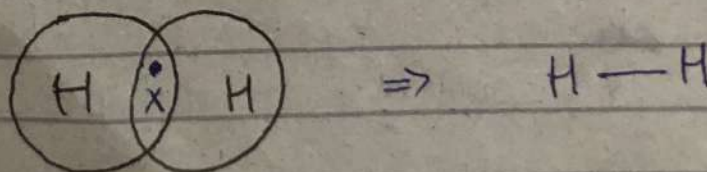
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# Question 5

a)

Give structure and function of Human ear.

## 1- Structure of Human Ear

Ear has three different sections.

### A) Outer Ear

The outer ear consists of an outer, funnel like structure called the auricle or pinna, and an S-shaped tube called the external auditory meatus or auditory canal. When sound waves are collected they hit the tympanic membrane or ear drum which is a boundary between outer and middle ear.
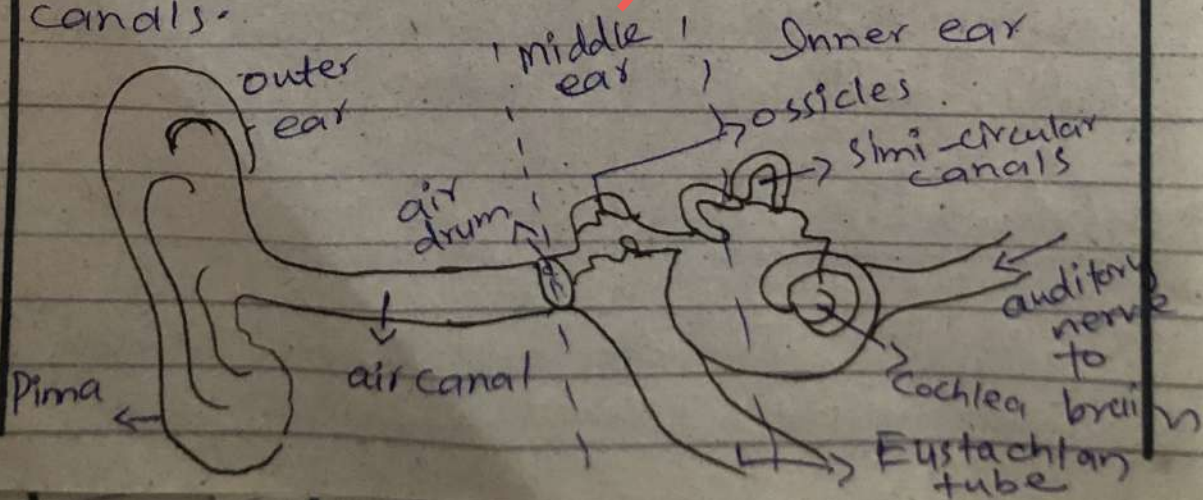
### B) Middle Ear

It consists of an air-filled space havins three small bones

called auditory ossicles which are named according to their shape — the malleus (hammer), incus (anvil) and stape (stirrup). These are the smallest bones in the human body. A Eustachian tube connects middle ear to the throat. This tube allows air to pass between the tympanic cavity and the outside of the body.

## 5) Inner Ear

It consists of a complex system of inter-communicating chambers and tubes called a labyrinth. The parts of labyrinth includes a cochlea and three small semi-circular canals. A bony chamber is called vestibule located between Cochlea and Semi-circular canals.



outer ear

middle ear

Inner ear
ossicles

Simi-circular canals

air drum

air canal

auditory nerve to brain

Cochlea

Eustachian tube

Pima

## 2) Function of Ear

The main function of ear is hearing and balancing. When sound waves hit eardrum, it vibrates and sends these vibrations to smalles bones. The stirrup passes those vibrations aions a coiled tube in the inner ear. Inside Cochlea, there are thousands of hair-like nerve endings, cilia, when Cochlea vibrates, the cilia moves. A nerve message generates that is sent to brain through the auditary nerve. Brain then translates all that and tells one what he is hearing.

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**b)**

What is digestive system. What is the role of small intestine in digestion.

## Answer

**1— Digestive System**

A system which is mainly responsible for breakdown of larger food particles into simpler, and smaller and absorbable food particles is known as digestive system.

→ oral cavity

→ Esophagus

cardiac sphincter →

→ stomach

small intestine →

→ Bolus

→ chyme
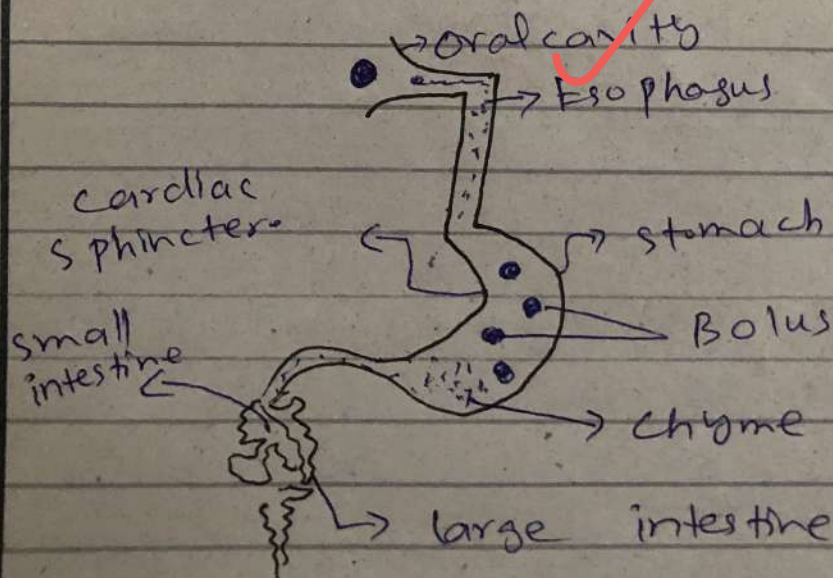
→ large intestine

## 2- Role of Small Intestine in Digestion

It plays a key role in the whole process of disestion. Maximum digestion or 90% digestion takes place in small intestine. Here, the absorption of food starts. All the required nutrients which are present in the food are absorbed here and mix into the blood stream through small capillaries.

Detail?
Parts of small intestine and their role?

c)

Write a short note on Vitamins:

## Answer

### 1- Vitamins:

Vitamins are organic chemicals, other than essential amino acids and fatty acids, that must be supplied to an animal in small amounts to maintain health.

## A) Importance of Vitamins

### i) Nutrient Metabolism

Vitamins act as coenzymes, which means they assist enzymes in carrying out chemical reactions involved in energy production and nutrient metabolism. They help convert carbohydrates, proteins, and fats into usable energy for the body.

## b) Growth and Development

Certain vitamins, such as vitamin A, vitamin D, and the B-complex vitamins, play a vital role in the growth and development of tissues, organs, and bones. They are particularly important during childhood, adolescence, and pregnancy.

## c) Immune System Function

Vitamins, especially vitami C, vitamin D, and the B-complex Vitamins, support the proper functioning of the immune system They help in the production and activation of immune cells, enhance the body's defense against infections, and promote wound healing.

## 2- Types of Vitamins

## A) Fat-Soluble Vitamins

Fat-Soluble vitamins are A, D, E and K. Their absorption by the body depends on the normal absorption of fat from the diet. Fat containing these vitamins is broken down by bile, a liquid released by the liver, and the body then absorbs the breakdown products and vitamins. Excess amount of fat-soluble vitamins are stored in the body's fat, liver and kidneys.

## B) Water - Soluble Vitamins

Water-soluble vitamins include vitamin C and the several members of the vitamin B-Complex. The B-complex vitamins are, $B_1$ (Thiamine), $B_2$ (Riboflavin), $B_3$ (Niacin), $B_5$ (Pantothenic acid), $B_6$ (Pyridoxine), $B_7$ (Biotin), $B_9$ (Folic acid) and $B_{12}$ (Cyanocobalamin)
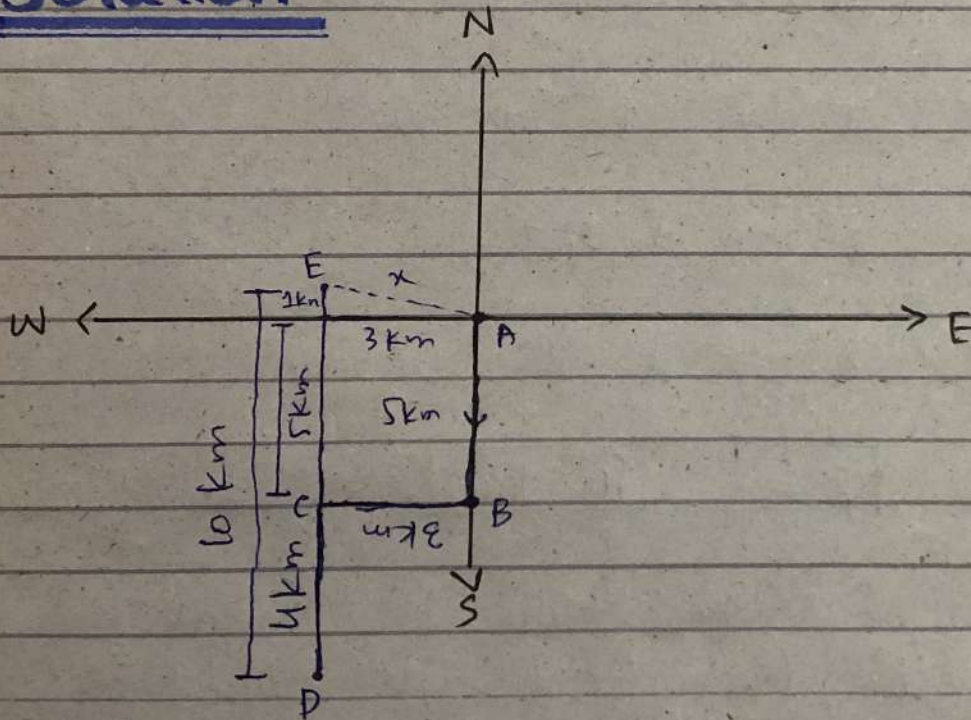
# Section: II

## Question: 8

**a)**

A man walks 5 km towards South ------?
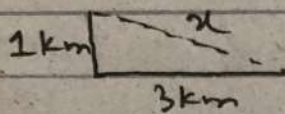
## Solution



The man, after walking 5km towards South, turning right and walking 3 km, then turning left and walking 4 km. After that he goes back 10km straight. Now he is in North-West direction

from his starting point.

How far from starting point!

Using pythagorian theorem

$1km$ $x$
$3km$

$\Rightarrow (Hyp)^2 = (Per)^2 + Base^2$

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

$\Rightarrow x^2 = 1 + 9$

$\Rightarrow x^2 = 10$

$\Rightarrow \boxed{x = \sqrt{10} \ km} \Rightarrow \boxed{3.16 \ km}$

So, the man is 3.16 km away from his starting point

**b)**

Find the arithmetic mean of cubes of 1st five prime number?

## Solution:

As, Mean = $\dfrac{\text{No. of observations}}{\text{Total Number}}$

First five prime numbers are:
2, 3, 5, 7 and 11

As given, arithematic mean should be the cube of these numbers

$\Rightarrow 2^3 = 8$

$\Rightarrow 3^3 = 27$

$\Rightarrow 5^3 = 125$

$\Rightarrow 7^3 = 343$

$\Rightarrow 11^3 = 1331$

$\Rightarrow$ Mean $= \dfrac{8 + 27 + 125 + 343 + 1331}{5}$

Mean $= \dfrac{1834}{5}$

$$\Rightarrow \boxed{\text{Mean} = 366\cdot 8}$$

## c)

A group of 50 men can construct ----- ?

## Solution

Original group $=$ 50 men
Road length $=$ 20 km

Increased in group $=$ 70 men

$$\Rightarrow \quad \frac{x}{40} = \frac{50}{70}$$

$$\Rightarrow \quad x = \frac{200}{7}$$

$$\Rightarrow \quad \boxed{x = 28\cdot 5} \text{ days}$$

Hence, it will take 28.5 days for a group of 70 men to construct a road of length 20 kilometers.

**d)**

Zahid left a property --- ?

## Solution

Total worth = 17,50,000
Debt = 150,000

Rest of the money = 1750,000 - 150,000

$= 16,00,000$

Distribution between a son and a daughter

$\Rightarrow$ Son : Daughter
2 : 1

$\Rightarrow$ 2 + 1 = 3

Son's Share $= \frac{2}{3} \times (16,00,000)$

Son's Share $=$ Rs 10,66,666.67

Daughter's Share $= \frac{1}{3} \times (16,00,000)$

Daughter's Share = Rs 533,333.33

Never miss the unit of the answer

a                                        b

# Question: 7

**b)**

In a certain code Brother —?

## Solution

BROTHER is written in code language as QDGSNQA. Here, for each word of BROTHER, the code is obtained by going one word back for each word i.e. for B, it is A, for R, it is Q, for O it is N and so on. But here, reading is from Left side of code & and writing is from right side. Therefore, the code for the word SISTER is QDSRHR.
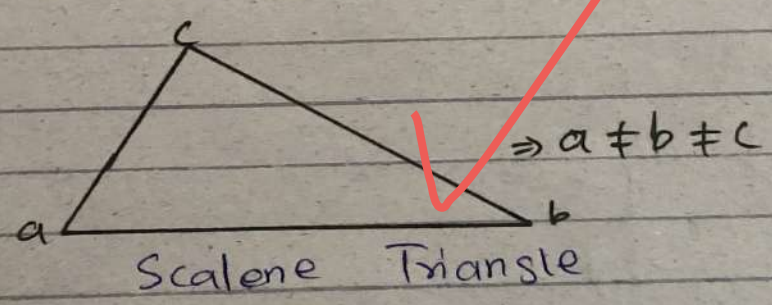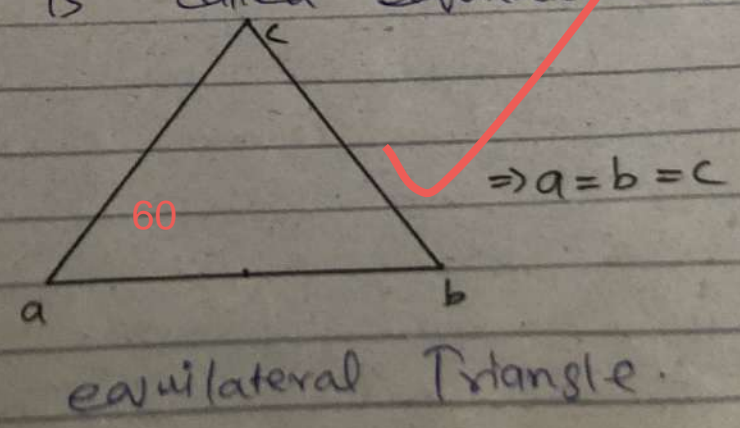
c)
Define and Draw the following

**1- <u>Scalene Triangle</u>**

A triangle in which all three sides are in different length, and all three angles are of different measures, is called Scalene triangle.



$$\Rightarrow a \neq b \neq c$$
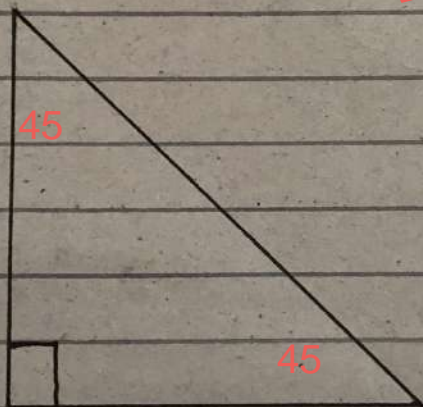
Scalene Triangle

**2) <u>Equilateral Triangle</u>**

A triangle having all three sides are of the same length is called equilateral triangle.



60

$$\Rightarrow a = b = c$$

equilateral Triangle.

## c) A triangle which is Isosceles and Right at the same Time:

An isosceles Right Triangle is a right triangle that consists of two equal length legs.



Isosceles Right triangle