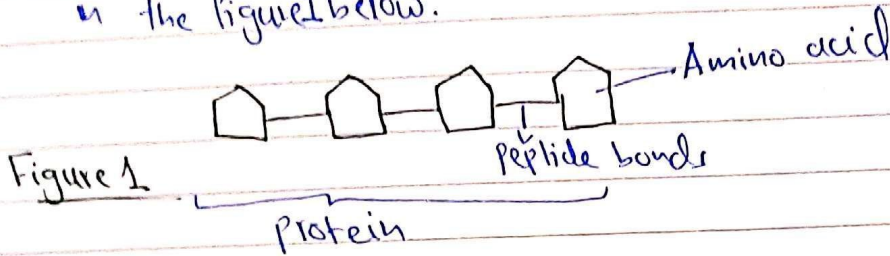


Q3

a) Proteins

Proteins are complex amino acids needed by the body for growth and development. These amino acids are chain together by the peptide bond as shown in the figure below.



The digestion of protein takes place in stomach and in the duodenum of the small intestine. The enzyme Pepsin is responsible for the breakdown of peptide bond. Amino acids are eventually produced which are then digested by small intestine.
 absorbed

Carbohydrates

Carbohydrates are complex nutrients essential for the body to produce energy. They are range from simple to complex structure as given in the table below.

Structure	Types
Monosaccharides	Glucose, Lactose, Fructose
Disaccharides	Galactose, Sucrose, Maltose
Polysaccharides	Starch, Glycogen

Table 1

The digestion of Carbohydrates takes place in mouth by enzyme Salivary Amylase and in the duodenum by enzyme Pancreatic Amylase. The complex structure is broken down into simpler molecules to be absorbed by small intestine.

Q3.

b) Atmospheric Pressure

Atmospheric Pressure, in laymen terms, is the level of pressure in atmosphere. The pressure generates on the basis of collision between the particles. The greater the collision, the more the atmospheric pressure is.

This is the reason why there is generally less pressure in high altitudes while it increases as we approach the altitude to sea level.

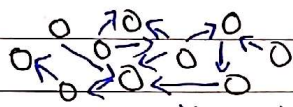


Figure 2

↳ Atmospheric Pressure increases as particles collide more frequently

Temperature

Atmospheric pressure is directly proportional to increase in temperature. This is because when the particles gain heat due to temperature, they collide more often due to excitement. Hence, the atmospheric pressure rises. Figure 2 shows a more frequent collision between particles as they gain heat energy.

Humidity

↳ The particles have lesser space which results in more frequent collision

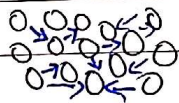
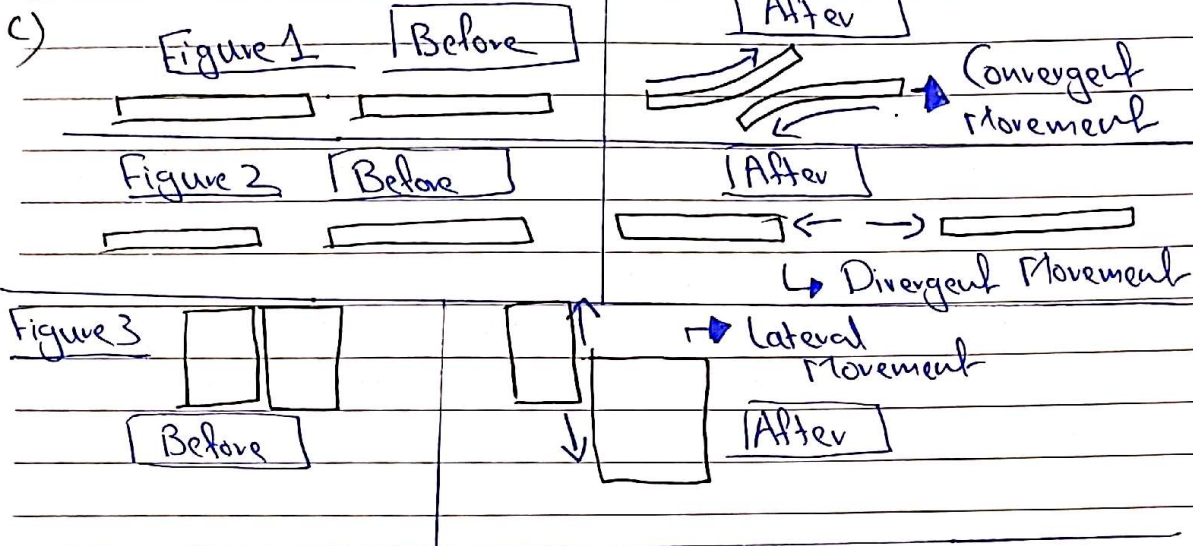


Figure 3

Humidity is defined as the concentration of water molecules in the atmosphere. The greater the humidity is, the more is the atmospheric pressure. This is because more particles are concentrated in a given area. Hence, the collision becomes more frequent. This results in rise of atmospheric pressure.

Q3 -



Earthquake

Earthquake occurs when the Tectonic plates floating on Mesosphere ~~collide~~ moves. The tension of the plates produces energy that is transmitted in the form of seismic waves causing Earthquake. There are different scenarios that causes earthquake.

1. Convergent Movement

When tectonic plates collide, one moves upward and the other downwards based on the densities. The collision forms pressure which releases energy causing earthquake. This is how the mountains are formed. Figure 1 shows how after the collision one tectonic plate moves upwards while the other one downwards.

2. Divergent Movement

When tectonic plates move away from each other, they produce stress causing earthquake. Figure 2 shows how tectonic move moves away from each other. This explains the phenomena of historical movements of plates to form continents.

from one giant tectonic plate million of years ago.

3- Lateral Movement

Lateral Movement is the movement of tectonic plates that results in them rubbing each other. This produces friction, resulting in release of energy.

Figure 3 shows how plates move against each other causing earthquake.

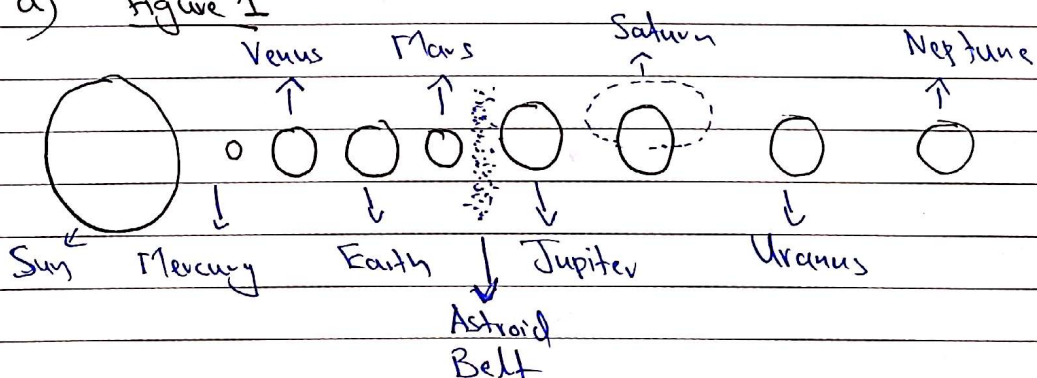
Q3 -

1) Radar

Radar is a navigation system that uses electromagnetic signals to show direction and detect objects in the year. The signals emitted from radar are received by satellite which then sends the signals to multiple satellite to find the exact location radar intends to navigate towards. In the process it also helps in detecting any object in a limited range which is flying in the year. Radar is used in air travel to navigate its way and to coordinate air traffic.

Q4 -

a) Figure 1



Solar System

Solar System is situated in Milky Way Galaxy.

It contains 1 Star, 8 planets, asteroids, meteoroids, dwarf planets and moons/satellites. Planet Earth is present in Solar System which is known as the sole planet in which life exists. It contains sun with the strongest gravitational pull in the solar system. The sun attracts all the planet to revolve around it. It rotates as well as revolves around the center of Milky way. Mercury is the smallest planet while Jupiter is the largest planet. Earth is the most dense among all the eight planets. Asteroid belt exists between Mars and Jupiter as shown in Figure 1. Many planets have their own satellites. For example, Earth has moon that revolves around it and Saturn has many moons such as Titan.

Q4-

b) Importance of Pituitary gland

Pituitary glands are responsible for producing hormones that stimulates other hormones. Hence, it aids in maintaining body temperature, blood pressure, heartbeat, reproduction and growth. For example, it stimulates the secretion of hormones like Testosterone responsible for reproduction.

c) Difference between RAM and ROM

RAM (Random Access Memory) is responsible for short term storage whereas ROM provides long term storage of memory. RAM aids in quick storage and removal of information that improves the efficiency of system. The information is lost if the device is shutdown. ROM, on the other hand, maintains the stored information even

the device is off.

USB

USB is a portable gadget that stores information and can easily receive and transfer data. It has the potential to store large data with small tangible space.

Motherboard

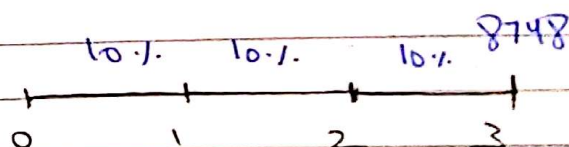
Motherboard is a hardware responsible for connecting various hardware within CPU and to the external hardware such as mouse and keyboard.

Q4. COP-29 allocated \$300-400 billion Million dollars to mitigate the effects of climate change. The target of 2030 to limit temperature rise upto 1.5°C since pre-industrial era was termed unrealistic by the developing and vulnerable countries to climate change. The countries most affected by climate change expected more than a trillion dollar to the cause. They stated that the given amount is not sufficient to reach the target to 1.5°C . This decision of lower funding prevailed due to ambiguities of the nations over the U.S. This is because Trump was contesting the elections and there speculations rose that U.S will backtrack as Trump did in Paris Agreement.

Section B

Q6-

a)



Carrying Value after 3 years = 8748 Rs/-

$$\text{Carrying Value} = \text{Initial value} - \text{Accumulated depreciation}$$

Let Initial value of washing machine be x

$$\text{Depreciation/Year} = x \times 10\% = 0.1x \quad (\text{Assuming depreciation was on straight line Method})$$

$$\text{Accumulated Depreciation} = 0.1x + 0.1x + 0.1x = 0.3x$$

$$\therefore 8748 = x - 0.3x$$

$$8748 = 0.7x$$

$$x = 12497.14 \text{ Rs/-}$$

The price of washing Machine three years ago was approximately Rs. 12497.

Q6

Let the present age of daughter be x

Time (Yrs)	Daughter	Father
0	x	$4x$
+5	$x+5$	$3(x+5)$
+10	$x+10$?

- At $t=0$, Father is $4x$
 $\therefore t=5$, father is $4x+5$

$$4x+5 = 3(x+5)$$

$$4x+5 = 3x+15$$

- $x=10 \rightarrow$ age of daughter at $t=0$

\rightarrow At $t=10$, daughter is $10+10=20$ years

- At $t=5$, father is $3(10+5) = 45$ years
- \therefore At $t=10$ Father is $45+5 = 50$ years

• At $t=10$, the age of the father will be 'n' time as the age of his daughter

$$n = \frac{\text{Age of father at } t=10}{\text{Age of daughter at } t=10}$$

$$= \frac{50}{20} = 2.5 \text{ times}$$

Ans: The age of the father 10 years from now will be 2.5 times the age of his daughter.

c) Football is spherical in shape

$$\therefore \text{Sphere's Volume} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times \frac{12^3 \times 12^3 \times 12^3}{2 \times 2 \times 2}$$

$$\text{Volume of Sphere (Football)} = 904.32 \text{ cm}^3$$

d)

$$\text{Speed} = \frac{D}{t}$$

Q1

$$a) \text{ Average} = \frac{\text{Sum of the number}}{\text{Total numbers}}$$

$$\begin{aligned} \text{Sum of} \\ 7 \text{ consecutive} \\ \text{number} &= 7x + 1 + 2 + 3 + 4 + 5 + 6 \\ &= 7x + 21 \end{aligned}$$

$$\frac{20 = 7x + 21}{7}$$

$$140 = 7x + 21$$

$$7x = 140 - 21$$

$$7x = 119$$

$$x = \frac{119}{7} = 17 \quad x = 17$$

$$\begin{aligned} \text{largest number} &= x + 6 \\ &= 17 + 6 \\ &= 23 \end{aligned}$$

The largest number in 7 consecutive numbers is 23

b) A's father's nephew = C
A's Cousin = D
D and C are not brothers

• Since C is A's father's nephew, C becomes the cousin of A.

• D is also the cousin of A but not C's brother

Therefore, D becomes the cousin of C as well.

c)

i) 4, 18, —, 100, 180, 294, 448

Step 1

Difference 16, $n-18$, 100- n , 80, 114, 158

Step 2

Difference 4, 14, 24, 34, 44

$$\therefore 16 + 4 = n - 18$$

$$20 = n - 18$$

$$\boxed{n = 38}$$

ii) 1, 2, 10, 37, 101, 226

Step 1

Difference 1, 8, 27, 64 \Rightarrow 125

The pattern shows that the difference is cube of each consecutive number.

Step

Cube 1^3 2^3 3^3 4^3 5^3 \Rightarrow Therefore the difference will be the cube of next consecutive number

$$5^3 = 125$$

$$\therefore 125 + 101 = \boxed{226}$$

iii) 11, 17, 39, 85, 163 \Rightarrow 78 + 85

Step 1

Difference 6, 22, 46, $n = 46 + 32 = 78$

Step 2

Difference 16, 24 \therefore 32

Multiples of 8 in consecutive pattern \therefore the next number after 16 and 24 will be 32 (8×4)

Adding 32 to 46 and 85

$$32 + 46 + 85 = \boxed{163}$$

iv) 13, 24, 46, 90, 178, 354

Formula is $2n - 2$

$$\therefore 2(178) - 2$$

$$= 356 - 2$$

$$= \boxed{354}$$

v) 4, 36, 144, 400, 900, 1764

Step 1

Square root $2^2, \underline{6^2}, 12^2, 20^2, 30^2, 42^2$

Step 2

Difference

4 6 8 10 12
↓

Since it is changing by difference of 2, the initial numbers will have difference of 2

which make the the high two consecutive differences as 4 and 6

\therefore After 2, we will have $2 + 4 = 6$

$$\text{Squaring } 6 \Rightarrow 6^2 = \boxed{36}$$

d) A : B : C : D

1 : 2

3 : 2

3 : 4

$\rightarrow A : D = ?$

$$A : B = B : D$$

$$1- \frac{A}{B} = \frac{B}{C}$$

$$\frac{1}{2} = \frac{3}{2}$$

$$\frac{1 \times 3}{2 \times 3} = \frac{3 \times 2}{2 \times 2}$$

$$\frac{3}{6} = \frac{6}{4} \Rightarrow \therefore A:C = 3:4$$

$$2- \frac{A}{C} = \frac{C}{D}$$

$$\frac{3}{4} = \frac{3}{4}$$

$$\frac{3 \times 3}{4 \times 3} = \frac{3 \times 4}{4 \times 4}$$

$$\frac{9}{12} = \frac{12}{16} \Rightarrow \therefore A:D = 9:16$$

Difference ~~D-A = 2240~~ $D-A = 2240$
 $A = D - 2240$

$$D - 2240 = \frac{9}{25} \times (D - 2240 + D)$$

$$D - 2240 = \frac{9}{25} \times 2D - 2240$$

$$25D - 56000 = 18D - 22400$$

$$7D = 33840$$

$$D = 4840$$

$$A = 4840 - 2240 = 2600$$

$$B = \frac{2}{3} \times 2840$$

$$B = 1893.33$$