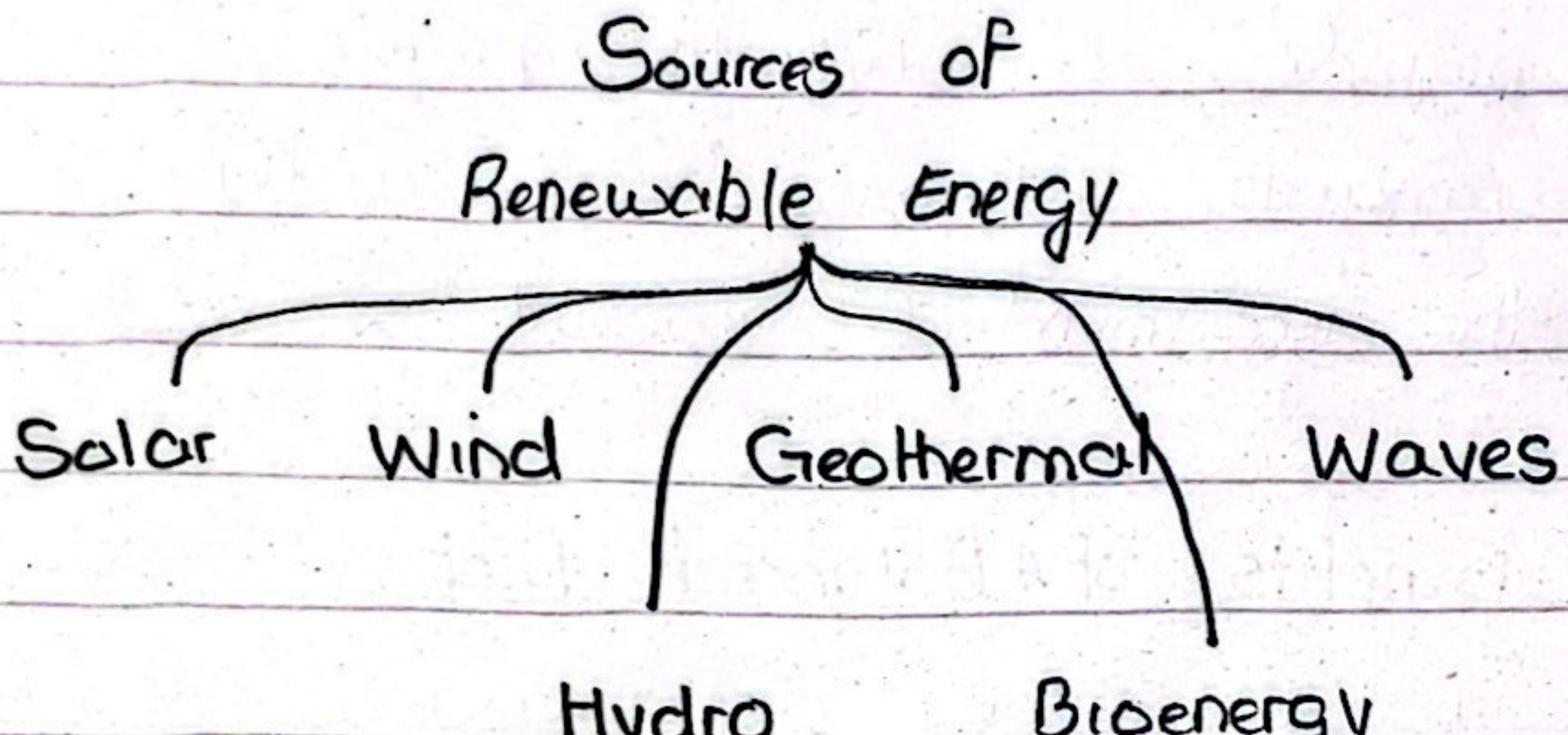
Q4

(a) Renewable Energy



Utilising Solar Energy

Pakistan's climate is such that it gets several days of full sun majority of the year.

The policies to encourage solar are

1. Tax breaks and subsidies for firms filling to sell solar power technology to consumer as well as firms utilising solar itself
2. Zero tariffs on importation of affordable solar tech from China.
3. Demarcation of certain "solar zones" in Provinces to be used as solar

Utilising Wind

1. Using the high wind areas of Sindh and the coastline to build turbines
2. Financial incentives

Utilising Hydro

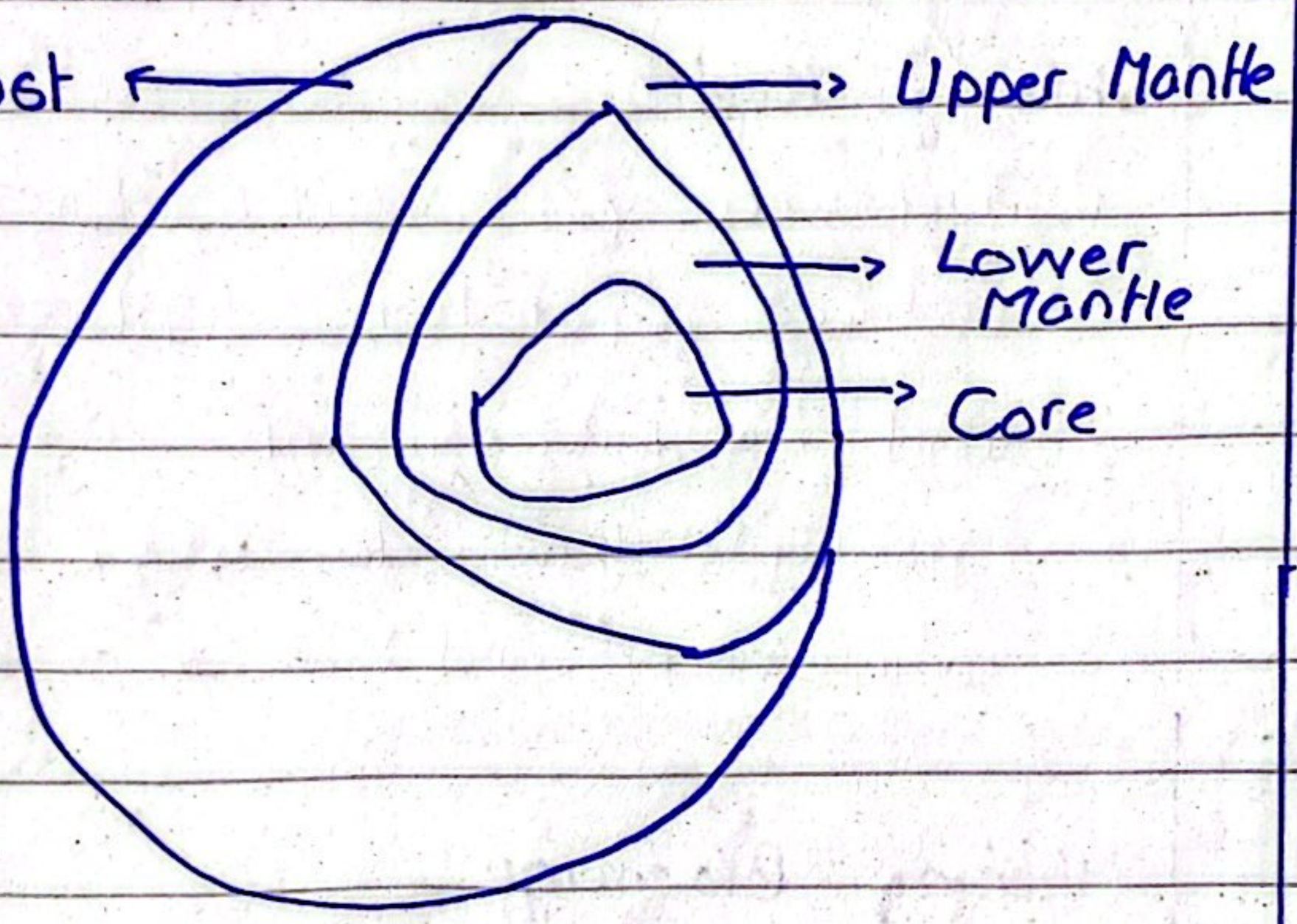
1. Preference for smaller dams to reduce population displacement and resistance in KP.
2. Smaller dams to make maintenance and desilting easier.

Utilising Bioenergy

1. Creating a government-led channel of acquiring bio fuel from farmers at fair rates.
2. Educating farmers on biofuel use and new techniques to promote adaption and self-sufficiency

(b) Structure of Sun

The Sun is a star at the centre of our solar system.



The Core

The core is the innermost layer of the Sun. It is very high in temperature and consists of molten metal such as Iron.

The Lower Mantle

The lower mantle is a thick viscous layer of magma, which is burning rock. It is denser than

Upper mantle which rises above it.

The Upper Mantle

The Upper mantle is also thick viscous magma. It is the source of convectional currents which causes plates to move.

The Crust

The layer of Earth on which life is found. It floats on the mantle. It consists of both ocean crust and land crust.

(c) Ceramics

Composition

Ceramics are made of mettallic and non-metallic substances

Charatteristics

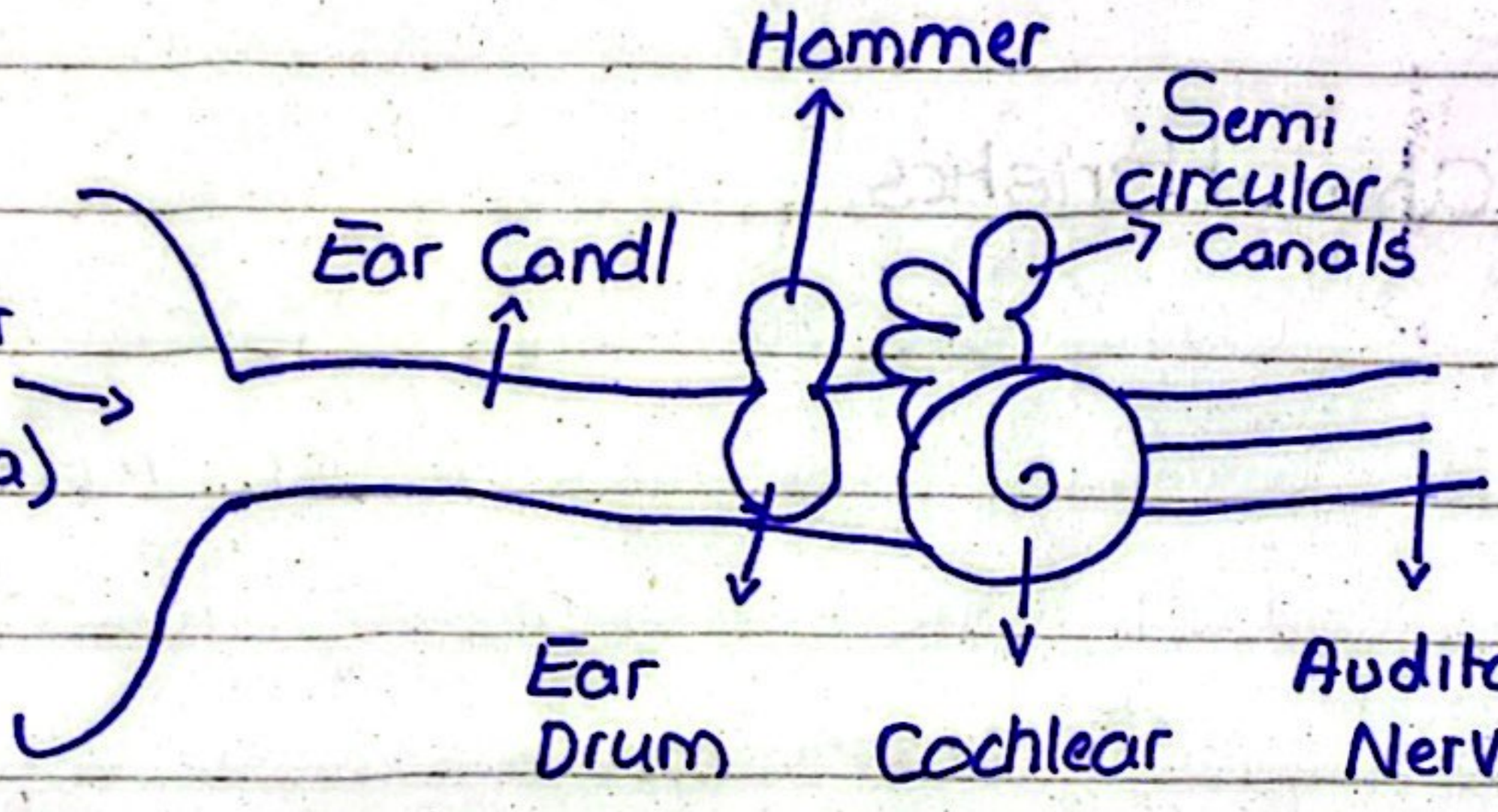
1. Ceramics are easily breakable.
2. Ceramics are good at retaining heat and maintaining temperature

Possibility of Recycling Ceramics

Ceramics can be recycled. They are dushed into a finè powder and then reformeal or used in other material manufacturing

(d) Structure of Ear

The human ear is used for hearing and is composed of six bones.



Pinna

The visible outer ear. It consists of a series of grooves and fine hair to improve the circulation of sound. It is made of cartilage.

Ear Canal

The pathway through which sound travels into the ear. It is coated in wax to protect from infection and impurities.

Ear Drum

A thin curtain which protects the Inner ear from loud noises.

Semi circular Canals

Small canals that improve the identification of sound.

Cochlear

The main sound-recognising part of the ear. It turns the vibrations into ~~sound~~ ~~and~~ auditory information and sends it to the auditory nerve.

Auditory Nerve

The nerve that carries auditory information from the cochlear to the brain, where it is decoded as music, voices, or sound.

Q5

(a) Artificial Intelligence

Artificial intelligence refers to the intelligence of a GPU which can perform tasks using logic.

In recent times, consumer level artificial intelligence has seen a boom with Open AI's Chat GPP, Google's Gemini and others

Types of Artificial Intelligence

i) Generative Artificial Intelligence

Generative AI can think on its own and understand complex prompts. It is usually used in tasks with greater complexity and informational volume. It is more expensive than others.

ii) Large Language Models (LLM)

LLM's are not pure AI. They

do not "think" but rather use training input data to recognise the language used in prompts and predict the next word. They handle tasks from low-medium complexity and lower informational volume. Most consumer AI products are LLMs.

Capability to Outsmart Humans

While debateable, current consensus on the topic says AI is not there yet. AI may be able to handle greater data than the human brain but they can also be confused. The AI hallucinations phenomena, in which AI begins to present fabricated information as true is common with AI products.

Moreover, AI's are trained on human collected data which means that human biases carry over to AI.

(b) Rocks

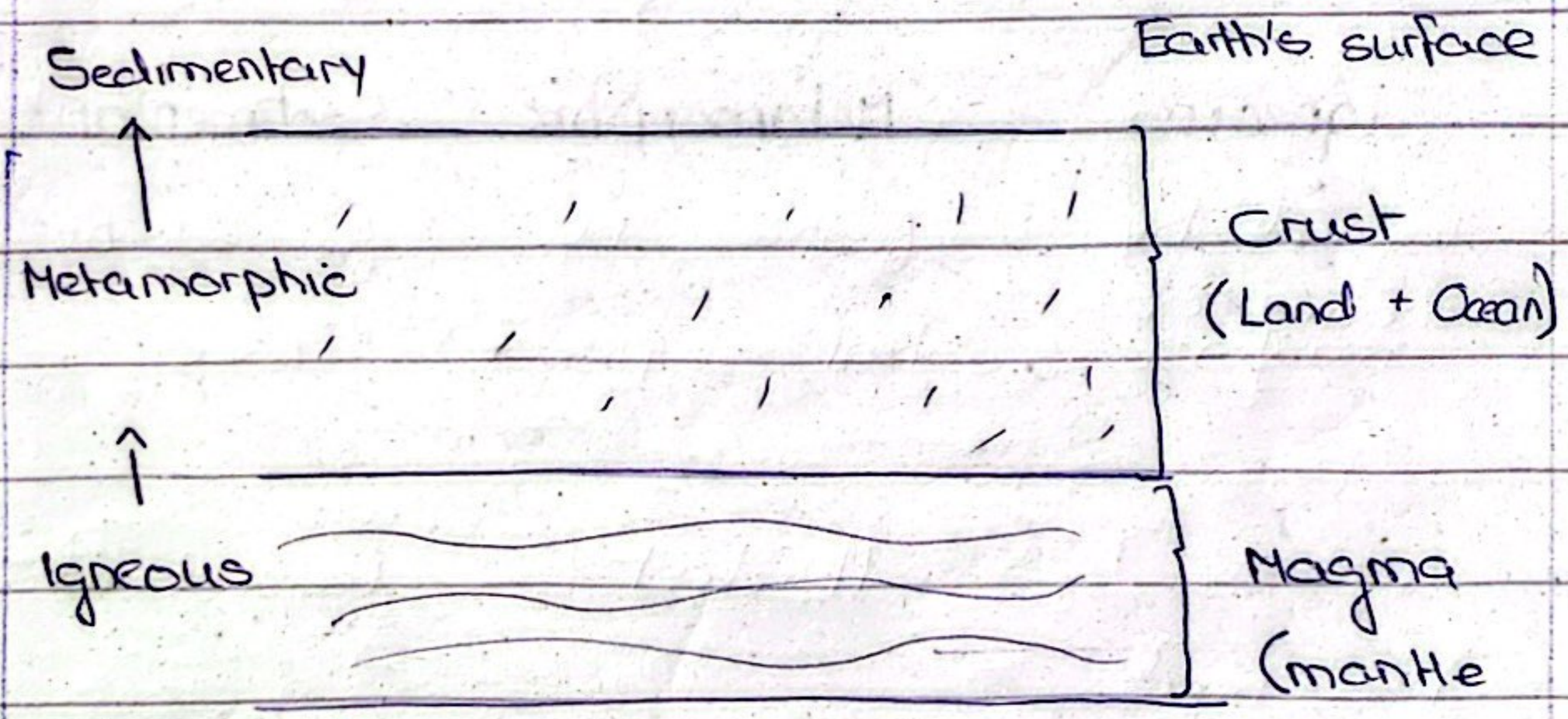
Rock Formation

Rock formation refers to geological formations created out of rocks.

Examples : Ravines, canyons, cliffs etc.

Rock Cycle

The rock cycle is the cycle of the formation of rocks and their types



In case of volanic eruptions or strong earthquakes that expose the magma on the ocean floor, igneous rocks are formed. The cooling of magma forms igneous rocks.

When the rocks rise through the Earth's crust, they become stuck. The heat and pressure cause the formation of metamorphic rocks.

As the layers of rock on the Earth's surface and water erode, Sedimentary rocks are formed. Sediments carried by erosion eventually collect and form rocks

Igneous	Metamorphic	Sedimentary
Formed by cooling of magma	formed by heat and pressure	formed by erosion
Relatively less hard	Hardest	Least hard

(c) Carbohydrates

Structure and Composition

They are formed of long chains of Carbon, Hydrogen and Oxygen.

Types of Carbohydrates

Simple		Complex
Monosaccaride	Disaccaride	Polysaccaride
Glucose	Sucrose	Starch
~~Sucrose~~ Fructose	Maltose	Glycogen
Galactose	Lactose	

Simple	Complex
Simple chains	Chains with more than double triple bonds
Singular bonds and double	
Easier to digest	Harder to breakdown

Monosaccaride

They have chains of consisting of single bonds only.

Disaccoride

They have chains consisting of single and double bonds both.

Poly saccaride

They have chains of single, double and triple bonds all.

(d) Balanced Diet

Meaning

A balanced diet is a diet which provides carbohydrates, proteins, fats, minerals, vitamins, and water in the recommended amount.

Benefits of A Balanced Diet

1. It reduces deficiences, which in turn prevents and cures several ailments

2. It provides the proper amount of energy for day-to-day life.

3. It improves the appearance of hair, skin, and nails, thereby improving confidence.

4. It provides the necessary energy and nutrients to fight off illness by strengthening the immune system.

Section II

Q6.

(a)

Data Given

Initial population = 18,000

Future population = 22,500

Time period = 10 years

Percentage rise = ?

Solution

$$\text{Percentage change} = \frac{\text{future}}{\text{initial}} \times 100$$

$$= \frac{22,500}{18,000} \times \frac{5}{10}$$

$$= \frac{225}{180} \times 5$$

$$= 125\%$$

Answer 125% percentage rise.

(b)

Data Given

600 units in 9 days with 20 machines

? units in 12 days with 18 machines

Solution

Units	:	Days	:	Machines
600	:	9	:	20
x	:	12	:	18

$$\frac{600}{x} = \frac{12}{9} \times \frac{20}{18}$$

$$\frac{600}{x} = \frac{12}{9} \times \frac{20}{18}$$

$$\frac{600}{x} = \frac{12}{90}$$

$$\frac{x}{600} = \frac{30}{4}$$

$$x = \frac{30}{4} \times 600$$

$$x = \frac{30}{1} \times 250$$

$$x = 7{,}500$$

(c)

Data Given

Distance covered by car = 450 m / min

Distance covered by train = 69 km / 45 min

Solution

Converting km to m

69 x 1000 = 69,000 m

~~Car : Train~~

Train's distance in 1 min

69,000 : 45 min

? : 1 min

4600 13,800

69,000 = 1533.

, 3 45 min

Car : Train

450 : 1533

15 : 511

Answer 15 : 511 for Car : Train

(d)

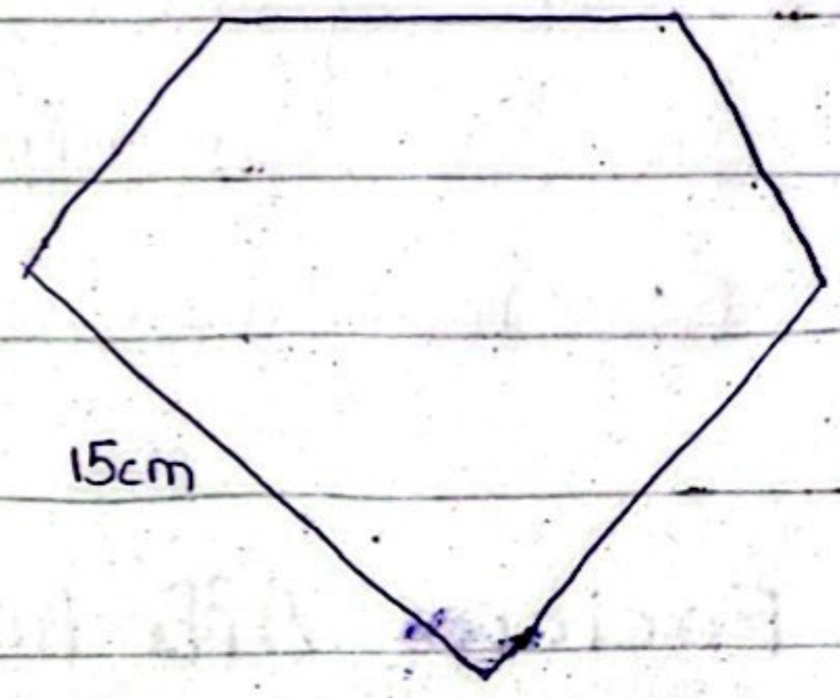
Data Given

Length of side = 15 cm

Number of sides = 5

Solution

Perimeter = sum of all sides



Perimeter = 15 + 15 + 15 + 15 + 15

= 75 cm

Answer 75 cm

Q7.

(a)

Definition of IQ

IQ, meaning intelligence quotient, is a general measure that aims to quantify logical, mathematical and ~~reasoning~~ reasoning intelligence.

Factors Affecting IQ

1. Genetics and Epigenetics
2. Health and diet
3. Use of abilities

(b)

Data Given

Radius = 4cm

Solution

Circumference of circle = $2\pi r$

$= 2 \times 3.14 \times 4$

$= 25.12$ cm

Answer 25.12 cm.

(c)

Data Given

20, 22, 21, 21, 23

Mode : most repeated value = 21

Median : middle value = 21

20, 21, (21,) 22, 23

Mean : average

$= \frac{20 + 21 + 21 + 22 + 23}{5}$

$= \frac{107}{5} = 21.4$

Range $23 - 20 = 3$

(d)

Data Given

Tahir	Umar	Usman
15,000	30,000	45,000
→		→ ?
5 month		4 month

Profit = 406,000 Total invest = 90,000

Solution

Tahir = 12 months

Umar = 12 - 5 = 7 month

Usman = 12 - 8 = 4 month

Tahir's share = $\frac{15,000}{90,000} \times 406,000$

$= \frac{1}{6} \times 406,000 = 67,000$

Umars share = $\frac{30,000}{90,000} \times 406,000 = 135,000$

Usman's share = $\frac{45,000}{90,000} \times 406,000 = 203,000$

Answer

Tahir's share = 67,000

Umar's share = 135,000

Usman's share = 203,000