M#2

General Science and Ability

Part – II

Section – I

Q no # 2

(a)

Measures for COP29 to encounter global warming

Global warming, which is a global threat, is hitting the developing and least developed world the most. Following measures should be taken for COP 29 to encounter this problem

1- Set an ambitious new climate finance Goal

The new global climate finance must be based on developing and least developed countries' needs. Adress previous shortcomings and prioritize grants and concessional finance.

2- Accelerate adaptation efforts and finance

Adaptation efforts must be

accelerated, with a focus on planning, implementation and quantitative metrics.

3- Build a sufficient response package for loss and damage

The loss and damage fund must be scaled up, with transparent and inclusive funding structure ensuring direct access for developing, least developed or vulnerable countries

4- Deliver and implement more ambitious climate action plans

Submit enhanced Nationally Determined contributions (NDCs) consistent with 1.5°C pathways, commit to regarding green house gases emissions and ensure a just transition.

5- Introduce and promote usage of Carbon Capture Sinks (CCS) and Carbon capture, utilization and Storage (CCUS)

CCS ⇒ Artificial Carbon sinks

Directly traps CO_2 thus preventing it from reaching atmosphere

According to IPCC:

"Carbon capturing sink will become good mechanism in limiting global temperature below 2°C."

CCUS ⇒ works same as ccs but utilizes the stored CO_2.

∴

⇒ Countries will be able to reduce their emissions by half using these procedures.

(c)

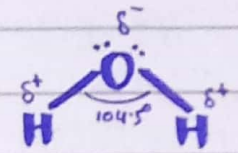
Why do atoms form chemical bond

- Atoms form chemical bond to achieve stability. This stability can be achieved by gaining or losing electrons from the outer most shell to achieve nearest noble gas configuration.
- Stability is increased and energy of atoms is reduced by

by this process

Structure of water

- The molecular formular of water is H_2O.
- It consists of 2 Hydrogen and 1 Oxygen atom
- The Hydrogen and oxygen atom are held together by covalent bond



- water molecule is bent due to the presence of two lone pairs on oxygen atom that exerts repulsion on two hydrogen atoms.

(d)

Conductors

The materials which allow the electricity to pass through them are called conductors.

Examples: Copper, Aluminium, Iron

Semi- Conductors

These are the materials that conduct electricity partially. They have properties in between conductors and insulators

2 Types of semi-conductors

(i) Intrinsic Semi-conductors

A pure form of semi-conductor is called intrinsic semi-conductors.

(ii) Extrinsic semi-conductors

When impurity is added to a semi-conductor it becomes extrinsic semi-conductor

Examples Germanium, Silicon, Antimony

Metals

- All the elements which form positive ions by losing electron except hydrogen are called metals. Thus, metals are electropositive in nature.
- They are solid under normal conditions except Mercury (liquid)

Examples: i) Gold
ii) Lead
iii) Platinum
iv) Copper

Plastics

- Plastics are synthetic organic materials that can be shaped into variety of products under heat.
- In general they are made up of long chain like material & called polymers.

Examples: polyethylene , polypropylene

(b) Functions of

Arteries	Veins	Capillaries
1- Arteries carry blood, deoxygenated away from heart.	1- carry oxygenated blood towards heart.	1- involved in exchange of water, nutrients and oxygen.
2- Can withstand high blood pressure	2- can withstand low blood pressure	2- can withstand low blood pressure and are extremely thin

2- Their blood flow is away from heart to body tissues.	2- They carry blood back to heart from body tissues.	2- Exchange with tissues
4- Supply oxygen, nutrients	4- Return blood, maintain pressure	4- Enable exchange, homeostasis
5- Divide into small arterioles	5- Merge into larger venules	5- Form form network, rejoin venules

Q#5

Artificial intelligence

Artificial intelligence refers to computer systems capable of performing complex tasks on command of humans such as reasoning, making decisions or problem solving.

2 Types

① Weak AI
- Requires human assistance
- Siri
- Open AI

② Strong AI
- Without human assistance
- Cars without drivers

A.I can outsmart humans?

i) A.I can outsmart humans in certain tasks but not in specific domains

ii) It can outsmart humans in solving problems related to larger data base, can perform tasks accurately and more faster etc.

iii) But it cannot outsmart humans in certain aspects like Emotional intelligence, social understanding, creativity, General problem solving.

iv) Moreover, it cannot poses unique abilities like intuition, empathy and critical thinking.

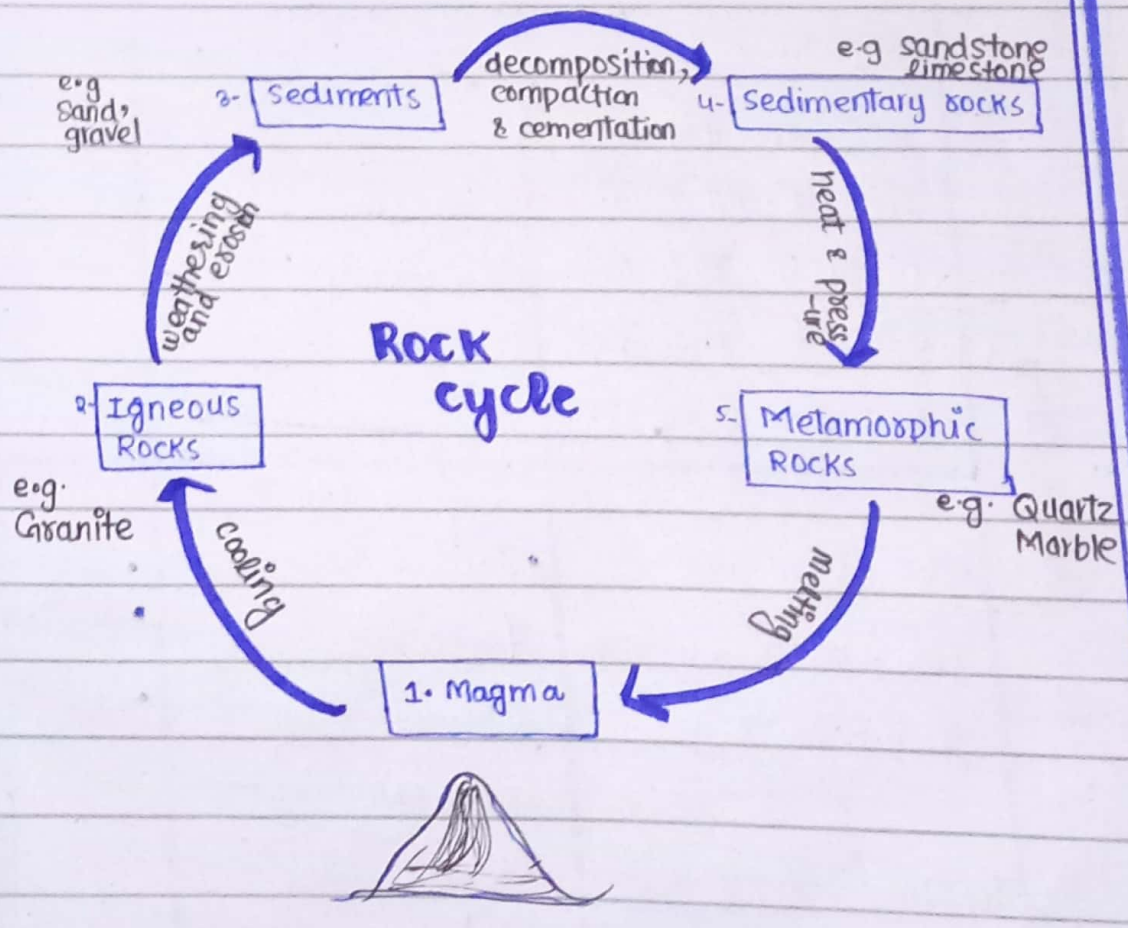
(b)
Rock formation

A rock formation is an isolated, scenic or spectecular surface ~~to~~ rock outcrop. These are usually the result of weathering and erosion sculpting the existing rock.

Rock Cycle

Rock cycle is the entire journey rocks made as they change. It helps to explain how rocks are formed from other rocks. It can be defined as; the

"The time consuming transitions through geologic time among the three main types of rocks: sedimentary, Igneous and metamorphic rocks."



Types of Rocks

Type of Rock	Description	Formation	Example
Igneous	Color: Rocks with majority dark minerals and vary widely in color (gray, black, red, white Texture: Smooth, glassy, fine grained, coarse grained with visible crystals Composition Mainly Silica content. When Silica is above 75%. main minerals that form are fedspass.	• Igneous rocks form when magma (molten rock underground) or lava (molten rock above ground) cools and hardens	• Quartz Fedspar
Sedimentary	Color vary widely (red, white, brown gray, black) Texture Rough, grainy flaky	• Sedimentary rocks form through sedimentation: weathering and erosion of existing rocks	• clay • Minerals • Calcite

Type of Rock	Description	Formation	exam. pl
		transportation and decomposition of sediments	
Metamorphic	Color: Vary widely (gray, green, black, white, depending upon original rock) Texture: Banded, foliated with flattened minerals Composition: Recrystallized minerals form intense heat, pressure or fluid.	Metamorphic rocks formed when existing rocks are subjected to intense heat, pressure or hot fluid, causing them to crystallize or change their chemical composition	• Quartzite • Mica • Garnet

(d)

Balanced diet

It is a diet which contains the right @ quantities of essestial nutrients in it.

It has both micro and macro-nutrients

Macro-nutrients	Micro-nutrients
* Required in larger quantity	* Required in smaller Quantity
a) Carbohydrates	a) Minerals
b) Proteins	b) Vitamins
c) Lipids / Fats	c

Benefits of balanced diet

① Helps in weight control	② Improves mental health
③ Good for growth	④ Better skin and hair
⑤ Strong teeth and Bones	⑥ Helps in management of Diabetes
⑦ Improves Gut health	⑧ Reduces cancer Risks
⑨ Gives energy	⑩ Vital for proper functioning of organs

(C)

Carbohydrates

Carbohydrates are the most abundant biological compounds. It is estimated that more than 50% of total carbon content is present in the form of carbohydrates.

The ration of carbon, Hydrogen and oxygen in these molecules is 1 Carbon atom to 2 Hydrogen atoms to 1 Oxygen atom

C : H : O

1 : 2 : 1

Formulae: CH_2O

More commonly called sugars and occurs as natural sweetners.

Uses

1- They are used as energy storage source. Because most cells can convert simple carbohydrates into energy that can be harnessed by cell.

2- They are required for working of vital organs i.e. Heart.

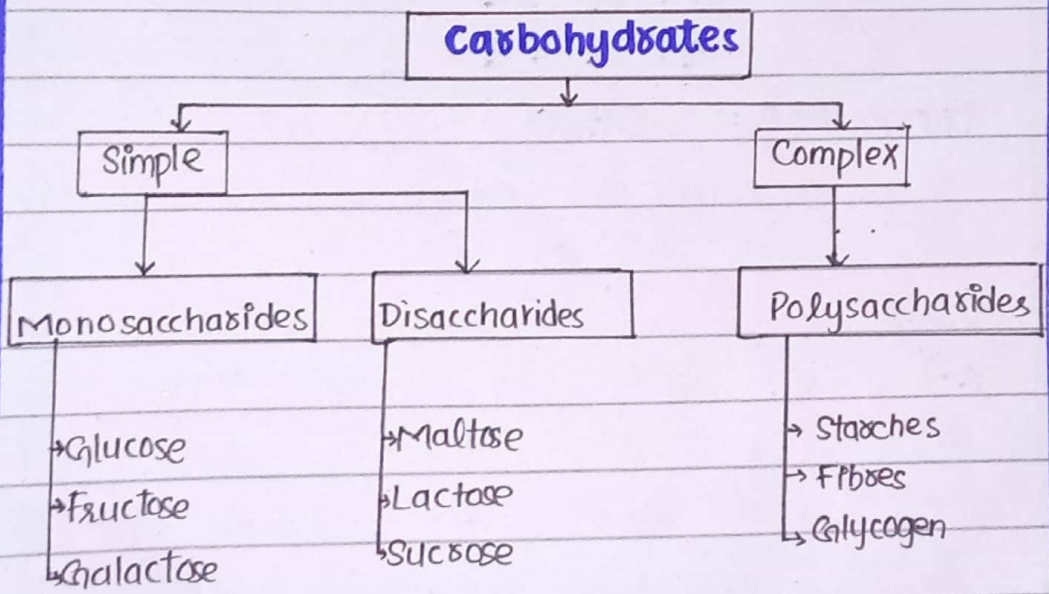
Sources : Wheat, Oats, Barley, Sweet fruits, Milk and other dairy products.

Deficieney: Their deficiency prevents energy supply in body which results in

- Low mental Performance
- Disturbance in the performance of vital organs

Excess : Excess can cause obesity and Diabetes

Types



Sec# II

Q6(a)

Solution

Total population = 22,500

Increase

old population = 18,000

Actual increase = New population − old population

= 22,500 − 18,000

= 4500

$$\text{Percentage increase} = \frac{\text{actual increase}}{\text{old population}} \times 100$$

$$= \frac{4500}{18000} \times 100$$

$$= 25\%.$$

Since, the increase is over decade to find the increase per year

$$= \frac{25\%.}{10}$$

$$= 2.5\%.$$

Total ~~incr~~ percentage increase in population per year is 2.5%.

Q6 (b)
Solution

① Daily production with 20 machines

600 units ÷ 9 days = 66.67 units

= 67 units per day

since, there are 20 machines so units produced per machine daily

67 units per day ÷ 20 machines = 3.33 units per machine per day

It means each machine can produce 3.33 units per day

②- Total production with 18 machines ~~on~~ in 12 days

3.33 units per day x 18 machines x 12 days = 720 units

Thus, the soap factory can produce 720 units in 12 days with the help of 18 machines

6 (c)

Solution

Speed

Car ~~distance~~

Time taken by car = 1 min = 1/60 hour

Distance covered by car = 450m

∴ 1000 m = 1Km

= 0.45Km

$$\text{Speed} = \frac{\text{Distance}}{\text{time}}$$

$$= \frac{0.45}{1/60}$$

$$= 27 \text{ Km/h}$$

Train Speed

Time taken by train = 45min = 3/4 hours

Distance covered by train = 69Km

$$\text{Speed} = \frac{\text{Distance}}{\text{time}}$$

$$= \frac{69}{3/4}$$

$$= \frac{69 \times 4}{3}$$

$$= 92 \text{ Km/h}$$

Ratio of Speeds

Car : Train

27 : 92

3 : 12

1 : 4

So, the train is moving 4 times faster than the car.

6 (a)
Solution

length of each side = 15cm

perimeter = 5 x length of each side

= 5 x (15)

= 75cm

So, the perimeter of pentagon is 75cm.

Q 7 (a)

I.Q (Intelligent Quotient)

I.Q is a number which represents a person's reasing ability. It is determined by dividing a person's score on special test by his/her age, then multiplying by 100.

$$IQ = \frac{\text{Mental age}}{\text{chronological age}} = \frac{MA}{CA}$$

Factors affecting I.Q

Several factors can affect I.Q such as

a) Genetics
b) Environment
c) Health

Q7 (b) (c)

Age of 5 students = 20, 22, 21, 21, 23

Mean

$$\text{Mean} = \frac{\text{sum of age of all students}}{\text{Total number of students}}$$

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

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

Mean of students ages is 21.4.

Mode (Most repeated value)

20, 22, 21, 21, 23

Mode = 21

Median

Arrange data

20, 21, 21, 22, 23

Median = 21

Range

20, 22, 21, 21, 23

Range ⇒ difference of maximum and minimum value

Range = Max. value − Min. value

= 23 − 20

= 3

Q7 (d)

Solution

Amount invested by Tahir for 12 months = Rs. 15000

Amount invested by Umar for 7 months = Rs. 30,000

Amount invested by Usman for 4 months = Rs. 45,000

Total investment = (Umar's investment × 7) + (Tahir's investment × 12) + (Usman's investment × 4)

Total investment = (Tahir's investment x 12) + (Umar's investment x 7) + (Usman's investment x 4)

= Rs. 15,000 x 12 + Rs. 30,000 x 7 + Rs. 45,000 x 4

= Rs. 1,80,000 + Rs. 2,10,000 + Rs. 1,80,000

= Rs. 5,70,000

Calculation of share of each person

$$\text{Tahir's share} = \frac{\text{Tahir's investment}}{\text{Total investment}} \times \text{total profit}$$

$$= \frac{1,80,000}{5,70,000} \times 4,06,000$$

= Rs. 1,44,000

= Rs. 1,44,000

$$\text{Umar's share} = \frac{\text{Rs. } 2,10,000}{5,70,000} \times 4,06,000$$

= Rs. 1,52,000

$$\text{Usman's share} = \frac{1,80,000}{5,70,000} \times 4,06,000$$

= Rs. 1,20,000

Q7 (b)

circumference of a circle

Radius of circle = $r = 4cm$

circumference of a circle $= C = 2\pi r$

$= 2 \times 3.14 \times 4$

$= 25.12cm$

So, the circumference of circle is 25.12cm.