

Mock-I

General Science And Ability.

Q2) Global warming ?

Ans Global Warming:

Def:

It is defined as long-term rise in temperature, which is caused by human activities that releases green house gases in the atmosphere. These gases trap heat on Earth, leading to warming effect on planet.

Causes:

Main causes of global warming are:

- a- Deforestation
- b- Burning fossil fuels
- c- Industrial process and transportation.

Measure to overcome:

COP-29 (is a conference of 29 parties) was held for having global negotiations on climate. Some of the measures are to

control climate change are stated below:

a. Climate education and awareness:

We have to promote education and training to make general public aware about the seriousness of the issue and ways to deal with it.

b. Electrification of transportation

We should promote the adoption of electric vehicles and emphasize on the usage of public transportation to reduce emissions.

c. Transition to renewable energy:

We will have to increase the use of solar, wind, and other renewable energy to reduce dependence on fossil fuels.

d. Carbon capture and storage:

We will have to work on the development of technologies to capture and store CO_2

produce from various activities.

e- **Global Cooperation:**

We should conduct the meetings often on global level and should make everyone realize the seriousness of the issue and ask for their cooperation on global level.

f- **Carbon pricing:**

Establish carbon taxes and provide incentives for reducing emissions.

g- **Ecosystem restoration:**

We should restore natural ecosystems like forests, wetlands and oceans to enhance biodiversity.

These reasons can help mitigate climate change and support sustainable development.

b- **Describe function of ---?**

Ans: The basic functions of arteries, veins and capillaries are:

A- Arteries:

- i) It carries oxygenated blood away from the heart to the rest of the body.
- ii) It has thick, muscular walls to maintain blood pressure.
- iii) It withstands high pressure from blood pumped by heart.
- iv) It is further divided into smaller arterioles and eventually capillaries.

B- Veins:

- i) It carries deoxygenated blood back to the heart.
- ii) It has thinner walls and are less muscular than arteries.
- iii) It contains one-way valves to prevent blood flowing backwards.
- iv) It merges into large venules and eventually returns to heart.

C- Capillaries:

- i) It allows exchange of oxygen, nutrients and waste between blood and tissues.
- ii) It has thin, permeable walls for easy diffusion.
- iii) It forms a vast network for efficient exchange.

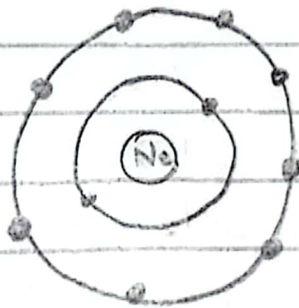
iv) It rejoins to form venules, which eventually becomes veins.

C- Why do atoms?

Ans: It is a universal rule that everything in this world tends to become more stable. Atoms get stability by attaining electronic configuration of noble gases. Having 2 or 8 electrons in the valence shell is the sign of stability.

Example:

Neon:



⇒ How can atoms complete 2 or 8 electrons:

An atom can complete 2 or 8 electrons by:

- i) By gaining of electron
- ii) losing of electrons
- iii) sharing of electrons.

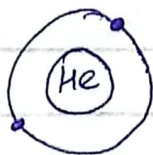
We know about two rules for attaining of electrons:

1) Duplet rule:

The tendency of atoms to attain two electrons in the valence shell in order to attain stability.

Example:

Helium (He) has two electrons in its valence shell and is stable.



2) Octet rule:

The tendency of atoms to attain eight electrons in the outer most shell in order to attain stability.

Example:

Oxygen (O) has six electrons in its valence shell. It share or gains two electrons to attain stability.

→ Why are noble gases non-reactive:

The noble gases have 2 or 8 e^- in their valence shells. It means that noble gases have their

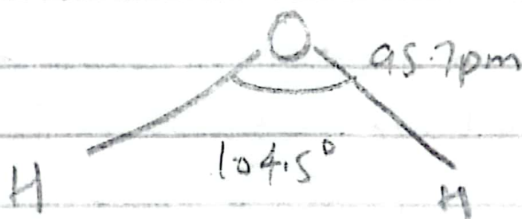
valence shells completely filled. These atoms do not have vacant space in their valence shells to accommodate extra e^- . Therefore, noble gases do not gain, lose or share e^- . That's why they are non-reactive.

Atoms can accommodate $8e^-$ in valence shell in three ways:

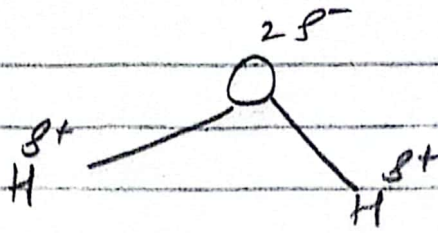
- * By losing e^- \rightarrow if less than $3e^-$
- * By gaining e^- \rightarrow if $5e^-$ or more than $5e^-$.
- * By sharing e^- \rightarrow Atoms with same electronegativity e.g. Hydrogen.

► Structure of water:

In the gaseous phase, water is a bent molecule with a bond angle of 104.5° and O-H bond length of 95.7pm as shown in the figure.



It is a highly polar molecule.



Water molecule dipole

In the liquid phase, water molecules are joint together by hydrogen bonds.

d- What are conductors ---?

Ans: a) Conductors:

Def:

It is a material that allows the flow of electric current through it. It have has atoms. or molecules that are able to move freely.

Example:

Copper, Aluminium, Graphite etc.

b) Semi-conductors:

Def:

It is a material with electrical conductivity between that of conductors or insulators. These can control the flow of electric current, making them essential for modern electronics.

Example:

Silicon.

c) Metals:

Def:

These are a type of materials which are typically hard, dense, and have high melting points. They are good conductors of electricity and heat and are malleable and ductile.

Example:

Lithium, Sodium.

d) Plastics:

Def:

These are type of synthetic or semi-synthetic solids that are moldable and can be melted to form a range of materials with different properties.

Example:

Nylon.

e) Ceramics:

Def:

These are the materials that are made from inorganic compounds, typically metal oxides, silicates, or carbides, that are fired at high temperatures to create a hard, non-metallic and non-

conductive material.

Example:

Earthenware, Porcelain etc.

Q15

a) what is AI? — .. ?

Ans Artificial intelligence:

Def:

AI (AI) refers to the development of computer systems that can perform tasks that are typically require human intelligence, e.g:

- * Problem-solving
- * Learning
- * Reasoning
- * Language understanding.

Usage: How it works:

(AI) systems use algorithms and data to make decisions, often independently, and can improve their performance over time through noting down their changing behavioral patterns.

Can it outsmart humans:

It is possible for AI, to outsmart humans. There are some arguments supporting the notion that AI can outsmart humans:

- a) It can process large amount of data and enhance itself far more quicker and better than humans.
- b) It has high accuracy levels than that of humans often surpassing humans.
- c) It can work more precisely than humans.
- d) It also has ability to improve itself through consistent modifications.

b- Define rock —?

Ans: Rock formation:

It refers to the process by which rocks are formed through geological processes. There are (3) three main types of rock formations.

1) Igneous rocks:

It is formed from cooling and solidification of magma or lava.

2) Sedimentary rocks:

These are formed from the accumulation and compression of sediments, such as sand, silt, and clay.

3) Metamorphic rocks:

These are formed when existing rocks are transformed by heat, pressure, and chemical reactions, without melting.

* Rock Cycle:

It is a continuous process that forms, breaks down and reforms rocks through geological processes.

forces that drive rock cycle:

- * Earth's internal heat
- * Climate
- * Tectonic forces
- * Surface processes
- * Gravitational forces.

* Types of rocks:

There are 3 basic types of rocks:

a) Igneous rocks:

These are formed by the

Solidification of magma from the interior of earth. These are also called Primary rocks as other rocks also originates from these rocks. These do not occur in layers. They do not contain fossils and most of them are crystalline in nature.

Types:

a) On the basis of mode of occurrence:

Intrusive
igneous
rocks

Extrusive
igneous rocks.

b) On the basis of silica content:

acidic

Basic

a)

* Intrusive igneous rocks:

These are formed by solidification of Magma beneath the Earth's surface.

a) Plutonic:

It cools deep beneath the Earth e.g granite.

b) Hypabyssal:

It cools just beneath the

the Earth's surface.

e.g. Batholith

* Intrusive igneous rocks:

It is formed by solidification of Magma at the Earth's surface. e.g. Basalt.

(b)

* Acidic:

It has more silica e.g.
Granite.

* Basic:

It has less silica and more of Ferro-Magnesium e.g.
Basalt.

B) Sedimentary rocks:

These are made up of weathered remains of igneous rocks. It contains fossils of plants and animals. These are also called stratified rocks because of layers. It holds reserves of Coal, Oil and natural gas.

Types:

i)

Mechanically formed:

These are also called clastic rocks. The breaking of igneous

rocks and then transported by water, streams to plains.

- * By air: loycee
- * By glacier: Boulder clay
- * By water: clay, sandstone.

ii) Organically formed:

These are also called non-clastic rocks. These are made from the weathered remains of plants and animals.

a) Calcareous:

These are made from plant remains. e.g Peat.

b) Carbonaceous:

These are made from animal remains. e.g Chalk.

iii) Chemically formed:

These are formed due to chemical composition's breakdown. (e.g) Rocksalt.

c) Metamorphic rocks:

Sometimes igneous or sedimentary rocks change due to great ~~pressure~~ pressure, intense temperature or chemical activity.

It is the changed form of igneous or sedimentary rocks.

c) Carbohydrates and its types: Carbohydrates:

Carbohydrates are one of the three main macronutrients which is the major source of energy. These are hydrates of Carbon, Hydrogen and oxygen. They are mainly found in our food in the form of starch and sugar. When we eat food (carbohydrate) break down into glucose and enter to our blood-stream. The body cells utilize glucose to produce ATP.

There are two types of Carbohydrates:

a) Simple carbohydrate: Glucose, sucrose, galactose

These have only one molecule of sugar

* Mono saccharide: It contains one molecule of sugar.

* Disaccharide: It contains two molecules of sugar.
glucose + glucose = Maltose.

b) Complex carbohydrates:

These are 2 types:

i) Oligosaccharide:

It contains two to ten molecules of glucose (e.g) Raffinose.

ii) Polysaccharide:

It contains ten or more molecules of sugar. It contains starch, glycogen, fiber and cellulose. We obtain starch from plants (stores glucose), fiber from covering of plants, glycogen from our muscles, our body makes it, cellulose from cell wall of plant cell.

d) Benefits of a balanced diet...?

Ans: Def:

A balanced diet is a diet that provides the body with necessary nutrients, vitamins and minerals in appropriate proportions to maintain optimal health. It includes a variety of foods from all food groups in the right amounts, and limits or avoids foods that are high in added sugars, saturated and trans fats and sodium.

A balanced diet provides numerous benefits, including:

a- **Optimal health:**

It supports overall physical and mental well-being.

b- **Weight management:**

It helps to maintain a healthy weight and a body composition.

c- **Disease prevention:**

It reduces the risk of conditions like diabetes, heart diseases and certain cancers.

d- **Stronger immune system:**

It boosts immunity and resistance to infections.

e- **Mental clarity and focus:**

It supports cognitive function and mental performance.

f- **Improved mood:**

It supports mental health and mood regulation.

g- Increased productivity.

It supports overall physical and mental well-being, leading to increased productivity.

Section: II

Q16:

a) The total population --- ?

Sol: Population 1 = 18000

Population 2 = 22500

$$\begin{aligned} \times \text{ Increase in population} &= 22500 - 18000 \\ &= 4500 \end{aligned}$$

$$\begin{aligned} \ast \text{ Increase in population in 10 years} \\ &= 4500 \end{aligned}$$

$$\begin{aligned} \ast \text{ Increase in population in 1 year} \\ &= \frac{4500}{10} \end{aligned}$$

$$= 450$$

Percent increase of population/year

$$= \frac{450}{18000} \times 100$$

$$= 2.5\% \text{ Ans.}$$

$$\begin{array}{r} 2.5 \\ 18 \overline{) 45} \\ \underline{36} \\ 90 \\ \underline{90} \\ 0 \\ \times \end{array}$$

Units	days	machines
600	9	20
x	12	18

Both days and machines are directly proportional to units

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

$$\frac{600}{x} = \frac{5}{6}$$

$$600 \times 6 = 5 \times x$$

$$3600 = 5x$$

$$\frac{3600}{5} = x$$

$$720 = x$$

Hence 720 units can be made in 12 days with the help of 18 machines -

c) Distance covered by car in 1 minute = 450 m

Distance covered by train in 45 minutes = 69 km

Ratio of their speed = ?

Sol:

$$\text{Speed of car} = \frac{D}{T} = \frac{450 \text{ m}}{60 \text{ sec}} \\ = \frac{15}{2} \text{ m/sec.}$$

$$\text{m/sec} \rightarrow \text{km/h} \quad \times \frac{18}{5}$$

$$= \frac{15}{2} \times \frac{18}{5}$$

$$= 27 \text{ km/hr.}$$

* Distance covered by Train = 69 km

Time = 45 min \rightarrow hr ($\div 60$)

$$= \frac{45}{60} = \frac{3}{4} \text{ hr.}$$

$$\text{Speed of train} = \frac{D}{T} = \frac{69}{3/4}$$

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

$$= 23 \times 4$$

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

ratio of their speeds

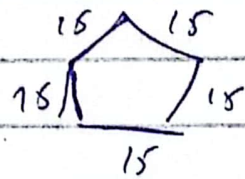
Car : Train

$$= 27 \text{ km/h} : 92 \text{ km/h}$$

$$= 27 : 92 \quad \text{Ans.}$$

d) Perimeter of pentagon

Each side equals to 15cm -



Perimeter of pentagon = $l+l+l+l+l$

As, l is same for all 5 sides.

So,

$$= 5 \times l$$

$$= 5 \times 15 \text{ cm}$$

$$= 75 \text{ cm Ans.}$$

Q8

a) B R O T H E R \rightarrow O D G S N Q A

S I S T E R = ?

B R O T H E R \rightarrow O D G S N Q A

S I S T E R \rightarrow O D S R H R

So, sister will be decoded

as "O D S R H R".

b)

missing term :

1, 2, 6, 21, _____ ?

Sol:

$$1 \times 1 + 1 = 2$$

$$2 \times 2 + 2 = 6$$

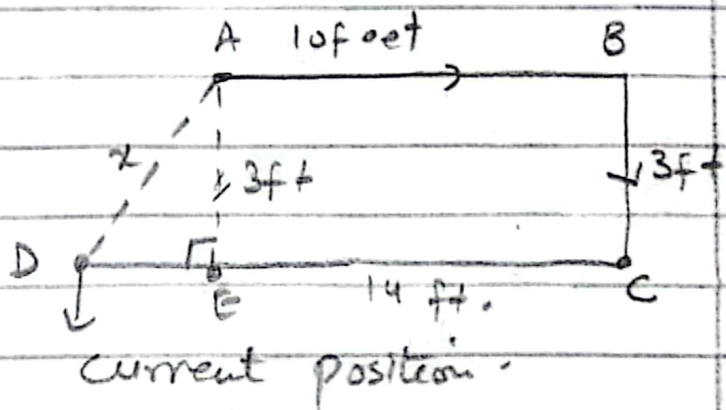
$$6 \times 3 + 3 = 21$$

$$21 \times 4 + 4 = 88.$$

The missing no. is 88.

c)

Naseer walked A to B in East = 10ft
 then, he turned to right & walked = 3ft
 Again, he walked to right = 14ft.



$$\begin{aligned} |DE| &= |CD| - |AB| \\ &= 14 \text{ ft} - 10 \text{ ft} \\ |DE| &= 4 \text{ ft} \end{aligned}$$

$$(\text{Hyp})^2 = (\text{Base})^2 + (\text{Perp})^2$$

$$\begin{aligned}
 |\overline{AD}|^2 &= |\overline{DE}|^2 + |\overline{AE}|^2 \\
 &= (4\text{ft})^2 + (3\text{ft})^2 \\
 &= 16\text{ft}^2 + 9\text{ft}^2 \\
 &= 16 + 9 \text{ft}^2 \\
 |\overline{AD}|^2 &= 25 \text{ft}^2
 \end{aligned}$$

Taking sq. root on b.s

$$\sqrt{|\overline{AD}|^2} = \sqrt{25\text{ft}^2}$$

$$|\overline{AD}| = 25 \text{ft} - \text{Ans.}$$

d)

Average temperature of a week = 33°C
 Average temperature of 1st 3 days = 30°C
 Average temperature of last 3 days = 35°C
 What is the temperature of ?
 4th day

Sol:

let,

the temperature of
1st 3 days = $x = 30^\circ\text{C} = 3x$

the temperature of last
3 days = $z = 35^\circ\text{C} = 3z$

the temperature of 4th day = $y = ? = y$

$$\frac{3x + y + 3z}{7} = 33^\circ\text{C}$$

$$\frac{3(30) + y + 3(35)}{7} = 33^\circ\text{C}$$

$$\frac{90^\circ\text{C} + y + 105^\circ\text{C}}{7} = 33^\circ\text{C}$$

$$\frac{195^\circ\text{C} + y}{7} = 33^\circ\text{C}$$

$$195^\circ\text{C} + y = 33^\circ\text{C} \times 7$$

$$195^\circ\text{C} + y = 231^\circ\text{C}$$

$$y = 231^\circ\text{C} - 195^\circ\text{C}$$

$$y = 36^\circ\text{C}$$

hence,

the temperature on 4th day of the week is 36°C .