

Question No: 4

Part (a)

Noise Pollution:

The noise Pollution is unpleasant, unwanted and annoying sound exceeding the intensity of 120dB.

According to WHO Prescribed optimum noise level is 45dB at day times and 35dB at night. Any sound above 80dB is hazardous.

Sources:

Noise originate from 2 sources.

- ① Natural (thunder, roaring of sea etc)
- ② Anthropogenic (Automobiles, industries etc)

Effects:

Noise Pollution have debilitating effects on human health.

- ① Auditory Effects
- ② Non-auditory effects.

Auditory: Noise Pollution causes auditory fatigue and that can completely damage ear and cause deafness.

Non-Auditory: Non-auditory effects which causes other systems of body to malfunctions.

- ① Frustration and depression
- ② Nausea and dizziness
- ③ Disturb coordination of limbs
- ④ Disturb thinking and concentration
- ⑤ Heart damage
- ⑥ Behavioral disorders in childrens
- ⑦ More accidents and injuries.

Ways To Curb:

Noise Pollution effects can be curb in many different ways. Some of them are following.

- ① Use of ear Protection devices
- ② Replacing noise Producing machines with new.
- ③ Creating Buffer zones.
- ④ Sound insulation by constructing windows with double or triple Panes of glass and

- filling the gap with sound absorbing material.
- (5) Industrial zones should be designed away from residential areas.
 - (6) Public awareness.
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Part (b)

Importance of Fibers In Diet:

Dietary fiber is a very essential component of Balanced diet due to its various functions such as:

- (1) Keep digestive system healthy
- (2) Promote absorption of nutrients.
- (3) Ease the movement of waste product and prevent conditions like constipation.
- (4) Support natural flora
- (5) Reduce risk of heart diseases
- (6) Improve joint pain by reducing inflammation.
- (7) Helps in weight management.

All of the above are important functions that needs fiber in Diet. Every organ gets nutrition after digestion of food

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and absorption of nutrients. In absence of fiber no organ would get the essential nutrients which are required for their functioning because nutrients were not absorbed and it would lead to collapse of human body.

Balanced Food:

The food is considered balanced when it contains all essential nutrients such as carbohydrates, lipids, Proteins, Vitamins, Minerals and dietary fibers which are required for proper functioning of individual. Balanced food is different for every individual depending on their needs.

A balanced Plate of food should have following components.

- ① Half Plate of fruits and vegetables
- ② One quarter consist of Proteins
- ③ One quarter consist of carbohydrates
- ④ Not a Part of Plate but fat is also essential that can be taken in

the form of rules.

It is essential to maintain hydration as well.

Part (c)

Drinking Water Quality & Standards.

Drinking water quality and standards are crucial for ensuring that water is safe to drink.

Water Quality: Water quality means that the physical, chemical, and biological characteristics of water. Safe drinking water must be free from bacteria, heavy metals, and chemical pollutants.

Standards: Standard refers to criteria that is set up by organizations or countries to measure the quality of water. Water is safe to drink if it meets the standards. Some of the standards are mentioned below.

① Bacteria must not be detected in any 100ml sample.

- ② Colour standard value should be ≤ 15 PCU.
- ③ Taste should be acceptable.
- ④ Odor should be acceptable.
- ⑤ Turbidity standard value should be 5 NTU.
- ⑥ pH value range between 6.5-8.5
- ⑦ TDS value 1000.
- ⑧ Contain all essential inorganic minerals such as Al, Sb, As, Cl, Cd, Cu etc.
- ⑨ Toxic inorganic minerals must be fall within standard range, like $F \leq 1.5$.
- ⑩ Pesticides and radioactive substances should also be within standard value such as Phends ≤ 0.002 and Beta emitters do not exceed 1.

Part (d)

Lithosphere:

The solid, outer part of earth is lithosphere, which plays a crucial role in various geological processes. It provides foundation for earth surface.

Explanation:

The lithosphere includes the brittle upper portion of the mantle and crust. It is bounded by the atmosphere above and the asthenosphere below. The lithosphere varies in thickness ranging from about 5 km under the oceans to around 30-50 km under continental regions. Various types of rocks are part of it such as igneous, sedimentary and metamorphic rocks. It also contains soil, mineral and natural resources. It is divided into tectonic plates that float on the semi-asthenosphere beneath them. The plates are constantly moving, leading to geological phenomena such as earthquakes and volcanic activities. Due to its erosion rocks and minerals breakdown and shape the landscape over time. It is essential for supporting life on earth due to its nutrients and natural resources.

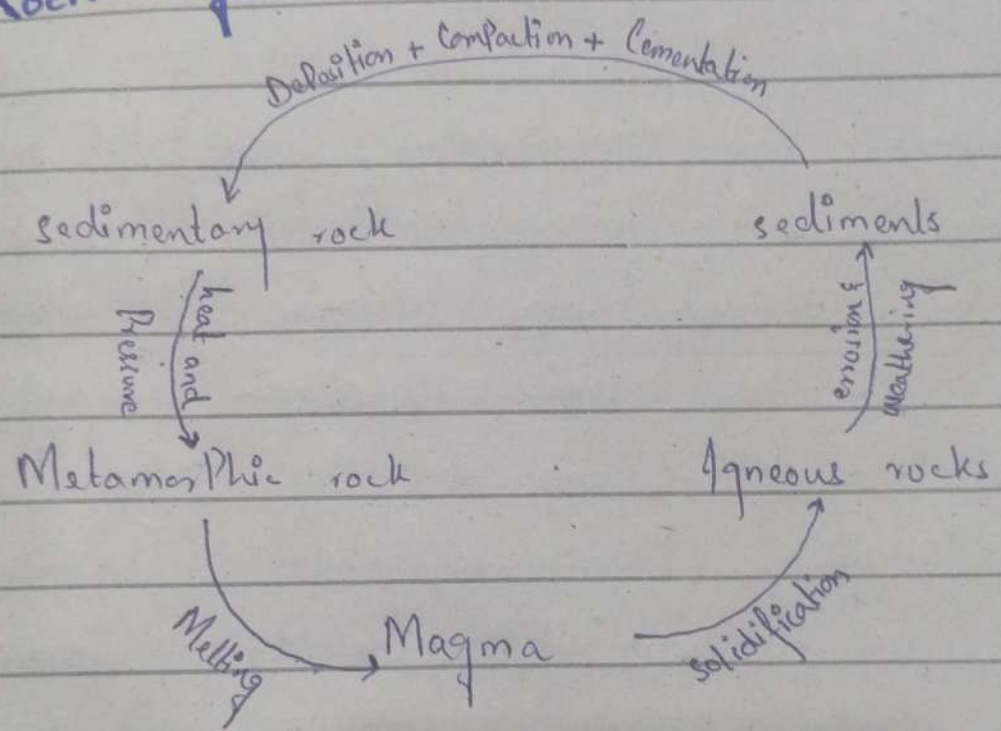
Rocks

Rocks are naturally occurring solid materials consisting of one or more

minerals. Rocks have 3 types
① Igneous ② Sedimentary ③ Metamorphic.

Igneous : form due to cooling and hardening of magma
Sedimentary : form due to erosion and weathering
Metamorphic : form due to intense heat and Pressure.

Rock Cycle:



Minerals:

Minerals are building block of rocks. Minerals are solids inorganic in nature and have fixed chemical formula along with orderly crystalline structure.

Minerals have some Properties such as

Colour : due to Presence of Particular element

Streak : colour display on grinding

Transparency : opaque

Lustre : surface of mineral reflects light

Density : mass per unit volume.

Q No 2

Part (a)

Dengue:

Dengue is viral infection in which body's immune system is under stress such as level of Platelets fall and it severely affects the musculoskeletal system of body.

Cause:

Main cause is dengue virus that is transmitted by female mosquito mainly of species *Aedes aegypti* and to

a lesser extent by *Ae. albopictus*.

Symptoms:

Dengue Present in the form of various symptoms such as:

- ① Dengue Haemorrhagic fever
- ② flu
- ③ severe headache
- ④ Pain behind eyes
- ⑤ Muscle and joint Pain
- ⑥ Swollen glands or rash.

Symptoms usually last for 2-7 days after incubation - Period of 4-10 days.

Part (b)

Dark Matter:

Dark Matter is the invisible type of matter that does not emit, absorb, or reflect light and can only be detected by its gravitational effects.

Explanation:

It is mysterious component of universe that make up 27% of universe mass and energy. Researches are limited to defined its exact nature but it is thought that it don't interact with electromagnetic force. It explain the movement of galaxies and additional gravitational Pull that is necessary to hold galaxies together. Dark matter slows the expansion of universe.

Dark Energy:

Dark energy is mysterious type of energy that is present in space and speeds up the expansion of universe.

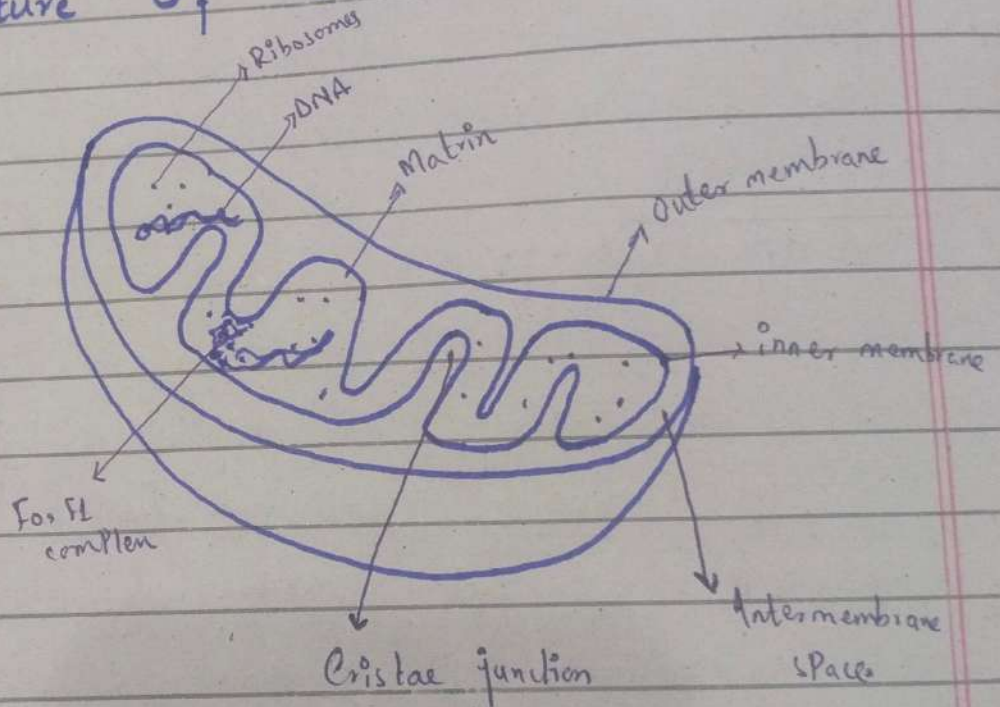
Explanation:

Dark energy makes 68% of universe's total mass and energy content. It is speculated that its density is constant that doesn't change over time. The observation of cosmic

microwave radiations depicts that dark energy is causing the accelerated expansion of universe by countering the gravitational forces.

Part (c)

Structure of Mitochondria:



The mitochondria is double membrane bounded structure which may be vesicle rod or filament shaped. Its outer membrane is smooth. Inner membrane consist of folding known as cristae. The inner surface of cristae have small

Knob like structure called F Particles.

Function:

Its main function is energy production in the form of ATP by various metabolic processes like kreb cycle.

How Powerhouse?

It is Powerhouse because it efficiently convert energy containing nutrients into ATP, providing energy for cellular processes. It produce energy be a series of processes or chemical reactions known as cellular respiration.

Cellular respiration include

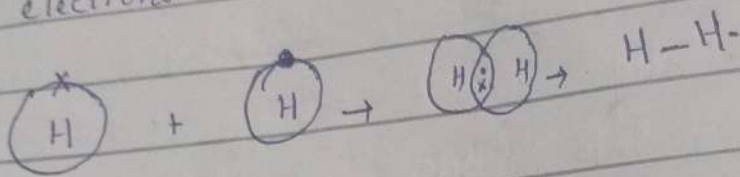
- (1) Glycolysis
- (2) kreb cycle
- (3) ETC

At the end of these 3 stages ATP is released.

Part (d)

Covalent Bonds:

A covalent bond is formed when two non-metal atoms mutually share one or more pairs of electrons.



There are three types of bonds.

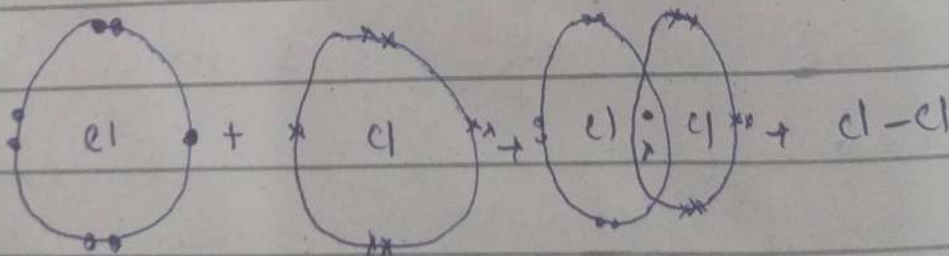
(1) Single

(2) Double

(3) Triple.

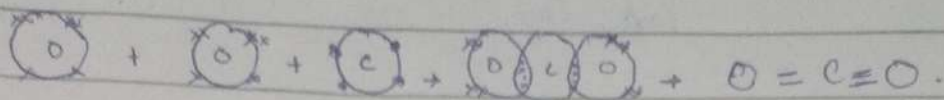
Single:

When bond is formed by mutual sharing of one pair of electron.



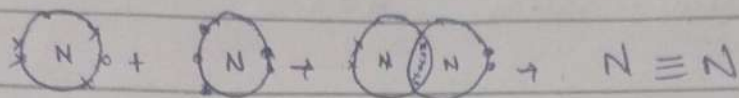
Double:

When bond is shared by mutually by two pairs of electrons.



Triple:

A bond that is formed by mutual sharing of three pairs of electrons.



Q No 6

Part (a)

$$\text{Mean} = \frac{\text{Sum of values}}{\text{Number of values}}$$

$$15 = \frac{9 + 8 + 10 + k + 12}{5}$$

$$15 = \frac{39 + k}{5}$$

$$75 - 39 = k$$

$$36 = k$$

Value of k is 36.

Part (b)

+ initial quantities of sugar solution: $4n$ & $3n$
based on $4:3$.

+ Water added = 10 liters

+ New quantity of total water = $3n + 10$ litres

+ New ratio $4:5$

$$\frac{4n}{3n+10} = \frac{4}{5}$$

$$5(4n) = 4(3n+10)$$

$$20n = 12n + 40$$

$$20n - 12n = 40$$

$$8n = 40$$

$$n = 40/8$$

$$n = 5$$

initial quantity of water sugar solution = $4n$
 $= (4)(5) = 20$

Ans = 20 liters.

Part (c)

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} (3.14)(12)^3$$

$$V = \frac{4}{3} (3.14) (1728)$$

$$V = 7238.4 \text{ cm}^3$$

Part (d)

Next number in series is 200.

$$-8 - (-10) = 2$$

$$6 - (-8) = 14$$

$$40 - 6 = 34$$

$$102 - 40 = 62$$

Differences are

$$2, 14, 34, 62$$

$$14 - 2 = 12$$

$$34 - 14 = 20$$

$$62 - 34 = 28$$

Their differences

$$12, 20, 28$$

$$20 - 12 = 8$$

$$28 - 20 = 8$$

Third differences are constant. 2nd differences also increased by constant number

so to find next second difference add

8 to last second difference

$$28 + 8 = 36$$

Add it to last 1st difference: $36 + 62 = 98$.

Add this to last in original series
 $102 + 98 = 200$

Q No 7

Part (a)

$$20\% \text{ of } n = y$$

$$y = 0.2n$$

$$y\% \text{ of } 20 = \frac{y}{100} \times 20$$

replace y with $0.2n$.

$$= \frac{0.2n \times 20}{100}$$

$$= 0.04n$$

$y\%$ of 20 in terms of n is
 $0.04n$

Part (b)

$$\rightarrow \frac{P+Q}{2} = 5050 \rightarrow P+Q = 10100 \rightarrow \text{eq (1)}$$

$$\rightarrow \frac{Q+R}{2} = 6250 \rightarrow Q+R = 12500 \rightarrow \text{eq (2)}$$

$$\rightarrow \frac{P+R}{2} = 5200 \rightarrow P+R = 10400 \rightarrow \text{eq (3)}$$

From eq (1)

$$0 = 10100 - P + \text{eq (4)}$$

Put it in eq (2)

$$(10100 - P) + R = 12800$$

$$R = 12800 - 10100 + P$$

$$R = 2400 + P \rightarrow \text{eq (5)}$$

Put (R) value in eq (3)

$$P + (2400 + P) = 10400$$

$$2P + 2400 = 10400$$

$$2P = 10400 - 2400$$

$$2P = 8000$$

$$P = 4000$$

Monthly salary of P = 4000.

Part (c)

P of two heads = 0.21

P of one head = 0.55

P of No head = 0.24

(1) Two head

$$P = \frac{105}{500} = 0.21$$

(2) 1 head

$$P = \frac{275}{500} = 0.55$$

that can be taken in

$$P(\text{No head}) = \frac{120}{500} = 0.24.$$

Part (d)

$$\text{Jane's age} = j$$

$$\text{dad's} = 4j$$

$$\text{after 14 years} = j + 14 \quad \text{Jane}$$

$$\text{Jane's father after 14} = 4j + 14.$$

$$4j + 14 = 2(j + 14)$$

$$4j + 14 = 2j + 28$$

$$j = 7$$

$$\text{Dad's current age} \quad 4j = (4)(7) = 28.$$

sum of their ages

$$j + 4j = 7 + 28 = 35 \text{ years.}$$
