

# SECTION I

QUESTION NO: 02.

Part (a)

## Dengue

Dengue is a viral infection, that leads to high fever, severe headache, joint pain, rash and fatigue. The fever typically ranges from  $40^{\circ}\text{C}$  to  $41^{\circ}\text{C}$  i.e.  $104^{\circ}\text{F}$  to  $106^{\circ}\text{F}$ .

## Causative Agents

The causative agents of Dengue is a mosquito born virus. ~~Called~~ *Aedes aegypti* is a specie of mosquito that carries dengue virus in its saliva. The Dengue virus containing mosquito usually lives in fresh water.

## Symptoms

There are various symptoms of Dengue fever. Some are listed below.

1. High fever ranges from  $104^{\circ}$  -  $106^{\circ}\text{F}$
2. Severe headache
3. Pain behind eyes
4. Joint and muscle pain
5. Mild bleeding from gums or nose in some

## Cases

6. Skin rash appearing 2 to 5 days after onset of fever.

In Severe Cases Symptoms can be ~~seen~~ bleeding, Organ damage, or dengue shock Syndrome which requires urgent medical care.

Part (b)

## Dark matter

Dark matter is mysterious, invisible form of matter that does not emit, absorb or reflect light, making it undetectable by conventional methods or instruments. It makes up 27% of mass of universe, it can only be inferred through its gravitational effects on visible matter, like galaxies and galaxy clusters. Its exact composition remains unknown but it plays crucial role in holding galaxies together and influencing the universe structure.

## Dark Energy

A mysterious form of energy, constitute about 68% of universe and responsible for its speedy expansion. Unlike gravitational energy that attract any object towards itself, Dark energy pushes away the object, countering gravity on

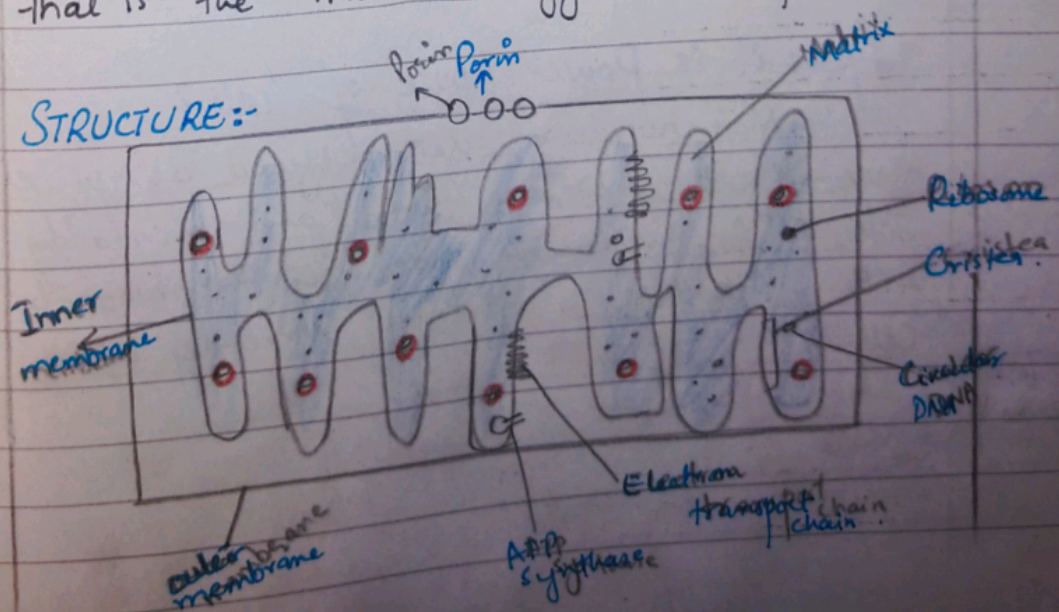
example /  $H_2$  and  $O_2$  -

Cosmic Scales. While its exact nature is unknown. It is considered as fundamental factor in shaping the structure of Universe and its fate. Dark energy is associated with Einstein's cosmological constant, some believe that it might be associated with Quantum vacuum energy.

## Part C

### Mitochondria

A membrane bound organelle found in most eukaryotic cells is known as Mitochondria. It is often referred to as the power house of cells because it is related to the generation of Adenosine Triphosphate (ATP) - that is the main energy source of the cell.



## Functions of Mitochondria

Production of ATP	Through oxidative phosphorylation, generate energy.
Cellular Respiration	It break down nutrients to produce Energy, $\text{CO}_2$ , $\text{H}_2\text{O}$ .
Regulation of Apoptosis	It control Programme cell death, remove damaged cell.
Calcium Storage	It store and release Calcium ions useful for cell signaling and muscle functions.
Heat Production	It produce heat from brown fat cells.

### How it is Power house of cell?

Mitochondria are referred as power house of cell, because they are primarily sites for producing adenosine triphosphate (ATP), that is energy currency of cell.

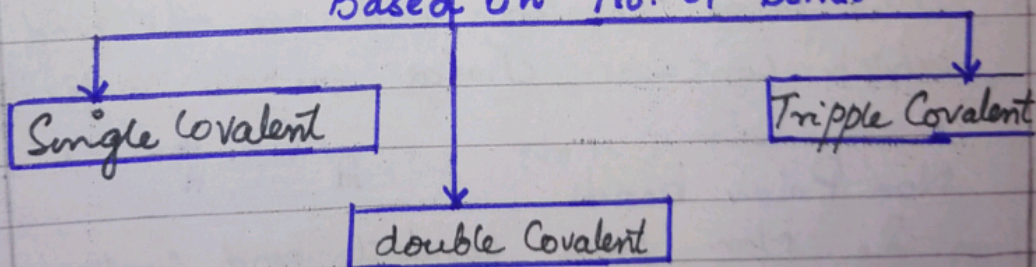
## Part (4)

# Covalent bonds

The bond formed by sharing of electrons - single or pair  $\frac{1}{2}$  form a molecule is called covalent bond. The sharing allows each atom which contributes its electron, to fulfil its outer most shell for stability attainment. The example includes  $H_2O$ ,  $CO_2$ .

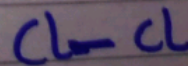
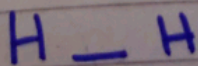
## Types of Covalent bond:

There are several types of covalent bond. Based on No. of Bonds



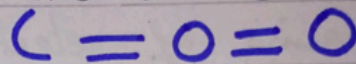
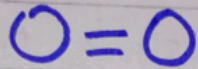
## Single covalent bond.

It involves sharing of one pair of electron between atoms  
example  $H_2$  and  $Cl_2$  -



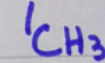
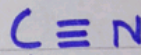
## Double Covalent bond:

Double Covalent bond involves sharing of ~~three~~<sup>two</sup> pairs of electron between two atoms. Example includes  $O_2$  and  $CO_2$ .



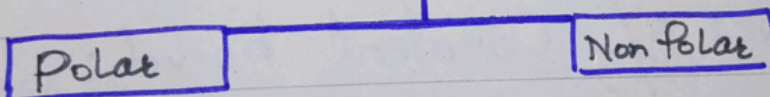
## Tripple Covalent bond

Tripple Covalent bond includes sharing of three pair of elections, it example includes  $N_2$  and acetonitrile ( $CH_3CN$ ).



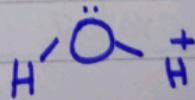
Classification

Base On Charge



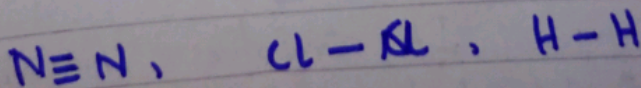
### Polar:

The polar covalent bond are the bond which contains charge such as water.



### Non Polar bond:

The non polar covalent bond contains no charge for example  $N_2$ ,  $Cl_2$ ,  $H_2$ .



## QUESTION NO: 4.

### NOISE POLLUTION

Noise pollution refers to excessive and harmful levels of noise in the environment, that can disturb normal acoustic environment. It primarily results from various human activities such as Transportation, Industrial activities and others.

### Harmful effects of Noise Pollution:

- Several harmful effects it contains;
- It can lead to hearing loss
- Stress and anxiety is created
- It can cause sleep disturbance
- It can be a reason of cardiovascular issues.
- It can cause wild life disruption & habitat alteration of many animals.

### Way to Curb Noise Pollution:-

There are various ways by which we can curb noise pollution.

- 1- Implementation of mixed use development to separate noisy and quiet areas.
- 2- Creation of green space which can act as Noise buffer.

- We may construct sound barriers along highway and industrial zones
- Noise Control Legislation can be enforced.
- By raising awareness about impacts of noise pollution. we can curb the bad effects of noise pollution.

## Part (b)

### Fiber.

A type of carbohydrate that body can not digest. It play crucial role in maintaining health.

### Importance of fibers in diet

#### Digestive health:

It promotes regular bowel movement and helps prevent constipation.

#### Weight Management:

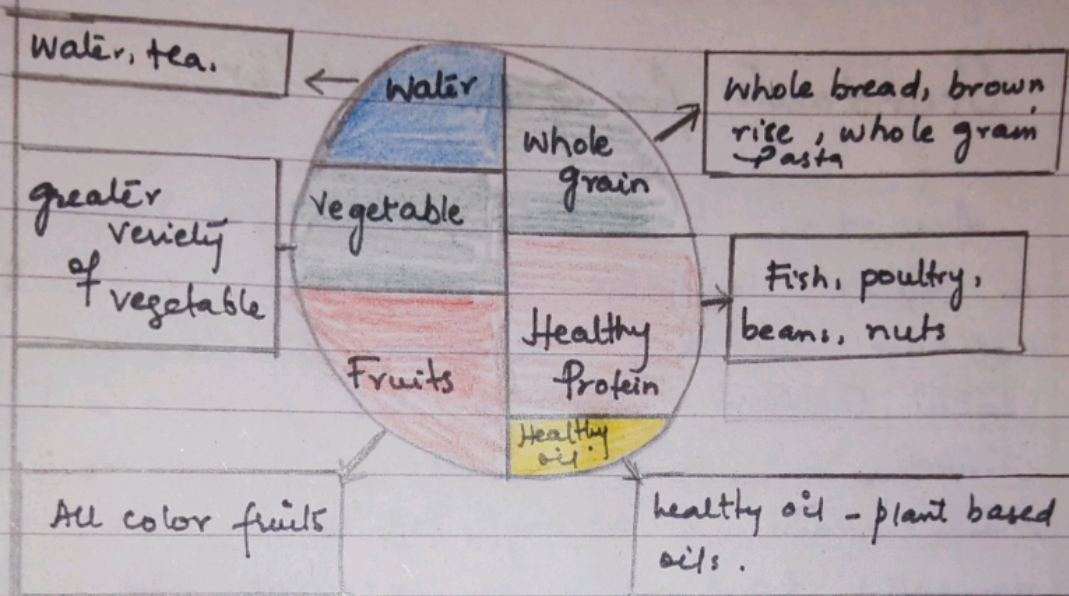
It increases feeling of fullness (satiety) which can decrease overall calorie intake, that aid in weight loss.

#### Heart Health

It lowers cholesterol level reducing risk of heart disease and stroke.



# Platter of food considered balance



Part (c)

## Drinking water Quality

The quality of drinking water is essential for health and well being. The factors that determines whether water is safe for human consumption includes heavy metals such as lead, Mercury, pesticides herbicides, nitrates, fluoride, Bacteria, PH level. Quality water should be free from all above mentioned factors. Although few essential chemicals or bacteria must

Present in water - for example calcium and magnesium but not in excess amount.

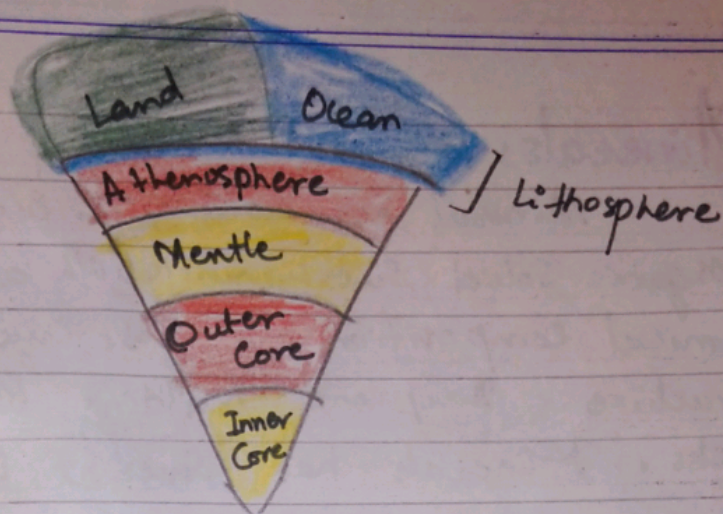
## Standards for quality water

According to world health organization a water suitable for drinking must not have bacteria such as E. coli or total coliform bacteria and virus and protozoa in 100ml of water. Although it may contain 0.01 mg/L of lead, 0.01 generally < 0.1 mg/L of pesticides and maximum 50 mg/L of Nitrates. Water should have pH level between 6.5 to 8.5 and its turbidity should not exceed 1 NTU.

## Part (d)

### Lithosphere

The Rigid outer layer of Earth consisting of crust and uppermost part of mantle is called lithosphere. It plays role in earth geology, ecology and various other geological process.



**Rocks:** A rock is a solid naturally occurring substance composed of one or more mineral. There are many types of rocks.

### Igneous Rock

It formed from solidification of molten magma. e.g. granite.

### Sedimentary Rock

It formed from accumulation of mineral e.g. limestone.

### Metamorphic Rock

It formed from alteration of existing rocks due to heat. e.g. marble.

## Minerals:-

Minerals are naturally occurring inorganic solid substance with a definite chemical composition, it has crystalline structure. They are building blocks of rocks. Minerals has several types.

### Naturally Occuring Minerals:

They includes Quartz, feldspar, mica and calcite.

### In Organic Minerals:-

They includes  $\text{SiO}_2$ ,  $\text{CaCO}_3$ .

### Solid State Minerals:-

It includes feldspar

### Crystalline Minerals:-

It includes Hematite  $\text{Fe}_2\text{O}_3$ .

## Section II

QUESTION 6.

Part (a)

Data: Arithmetic mean = 15  
9, 8, 10, K, 12

Required:

Value of K = ??

Formula:

$$\text{Arithmetic mean} = \frac{9+8+10+K+12}{5}$$

Solution:

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

By cross multiplication

$$15 \times 5 = 9+8+10+K+12$$

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

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

$$= \frac{54}{5} = 10.8$$

$$\boxed{K = 10.8}$$

Part(b)

Data:-

Ratio of Colored water = 4:3

Water added to mixture = 10 L

Ratio becomes = 4:5

Required:

Initial Quantity of sugar solution = ?

Solution:

Suppose, initial quantity of sugar sol = A

" " " Colored water = B

we can write it as.

$$\frac{A}{B} = \frac{4}{3} \text{ or } A = \frac{4}{3} \times B \quad \text{--- ①}$$

As we know 10 L water is added,  
it becomes B+10 so,

$$\frac{A}{B+10} = \frac{4}{5} \quad \text{--- ②}$$

Put value of A from equation ① to eq: ②

$$\frac{\frac{4}{3} \times B}{B+10} = \frac{4}{5} \quad \text{or} \quad \frac{20}{3} B = 4B + 40$$

to eliminate the fraction, multiply  
by 3

$$20B = 12B + 120$$

Taking value of B

$$8B = 120$$

$$B = 15 \text{ liters}$$

Now put value of B in equation 01

$$A = \frac{4}{3} \times 15$$

$$A = 20 \text{ liters}$$

The initial quantity of Sugar Solution = 20 liters

Part (c)

Data:- Radius of football =  $R = 12 \text{ cm}$

Required = Volume

Formula:- Volume of circle =  $2\pi r^3$

Solution:-

$$V = 2 \times 3.14 \times (12)^3$$

$$V = 2 \times 3.14 \times 1728$$

$$V = 10851.84 \text{ cm}^3$$

## Part(d) Series

$$-10, -8, 6, 40, 102 \quad ?$$

2                      34              62

Question: 07 Part(a)

Data:-

$$20\% x = y$$

Required:-

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

Solution =

$$20\% \text{ of } x = y.$$

$$\frac{20}{100} x = y \quad \text{or } y = 0.2x$$

and

$$y\% \text{ of } 20 = \frac{y}{100} \times 0.2$$

$$y\% \text{ of } 20 = \frac{0.2}{100} \times 0.20$$



## Part (b)

Data :-

Average of salaries of P and Q = 5050

" " " " Q and R = 6250

" " " " P and R = 5200

Required:

Monthly salary of P = ??

Solution:-

a. Average Salary of P and Q = 5050 =  $\frac{P+Q}{2}$

$$P + Q = 10100 \text{ — eq no. 1}$$

b. Average salary of Q and R = 6250 =  $\frac{Q+R}{2}$

$$Q + R = 12500 \text{ — equation no: 2}$$

c. Average salary of P and R = 5200 =  $\frac{P+R}{2}$

$$P + R = 10400$$

from equation no. 1 -  $Q = 10100 - P$   
put value of Q in eq: 2.

$$(10100 - P) + R = 12500$$

$$-P + R = 12500 - 10100$$

$$R = 12500 - 10100 - P$$

$$R = 2400 - P.$$

Put value of R in equation no: 03,

$$P + R = 10400.$$

$$P + 2400 - P = 10400$$

$$2P = 10400 - 2400$$

$$P = \frac{10400}{2400} = 4,300.$$

Salary of P is 4030.

Part (C)

Data

Tossed 500 times

Two head - 105 times

One head - 275 times

⊖ head - 120 times

Required

Probability to each event to occur

Formula:

$$\text{Probability} = \frac{\text{no: of favourable outcome}}{\text{Total no: of possible outcome.}}$$

Solution

$$\text{Two head} = \frac{105}{500} = \underline{0.21}$$

$$\text{Time head} = \frac{275}{500} = \underline{0.55}$$

$$\underline{\text{no. of head}} = 0.24 = \frac{120}{500}$$

Question: 7(d)

Data

age of jamies' dad =  $4 \times$  jamie  
after 14 years

Jamies' dad =  $2 \times$  jamie

Required

Sum of jamie's age & dad's age

Solution

Suppose age of jamie =  $x$

Jamie's father age =  $4x$

Now - after 14 years

Jamies father age =  $4x + 14$

after 14 years - twice age of

Jamie =

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

or

$$2x = 14$$

$$\text{age of J} = 7$$

$$\text{age of Jamie's father} = 4 \times 7 = 28$$

$$\text{Sum of Jamie \& his dad age} = 28 + 7$$

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