

Date: 19/12/24

Part II

Section - I

Q2-

a) Lipids

Lipids are essential component of the body composed of Fatty acids and Triglyceride. They are also known as Fats. It exists in various food sources such as oil, vegetable oil, milk and butter.

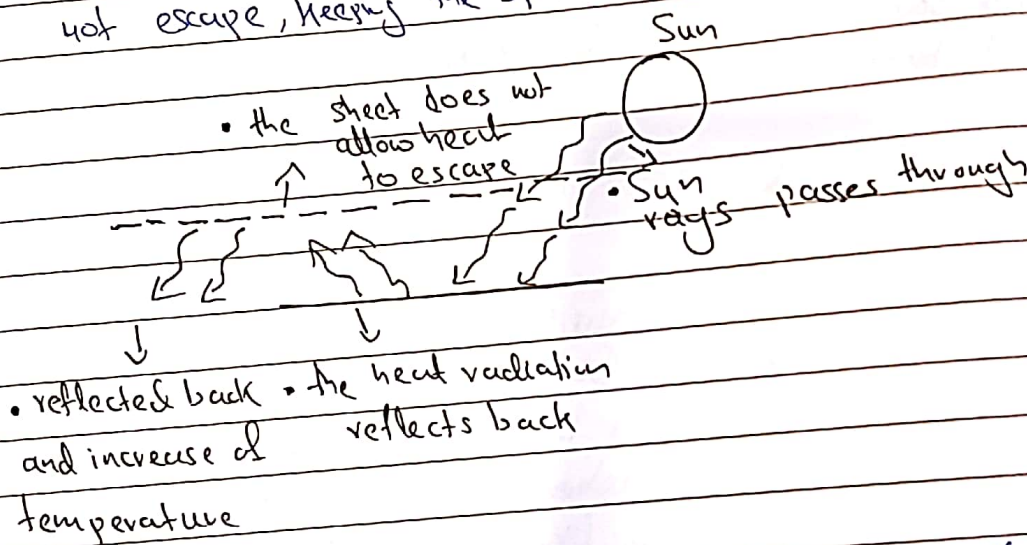
Types of Lipids

Lipids are majorly divided into saturated and unsaturated fats. Saturated fats are mainly found in products, like butter and are solid at room temperature whereas, unsaturated fats are present in products like vegetable oil and are liquid at room temperature.

Functions of Lipids

Lipids have various functions. First, they keep the body insulated and warm. Second, they are shock absorbers of the body. Fourth, they are source of energy (0.9 kcal/g unit). Fifth, they form the membrane of cells which acts as semi-permeable boundary for cellular activities.

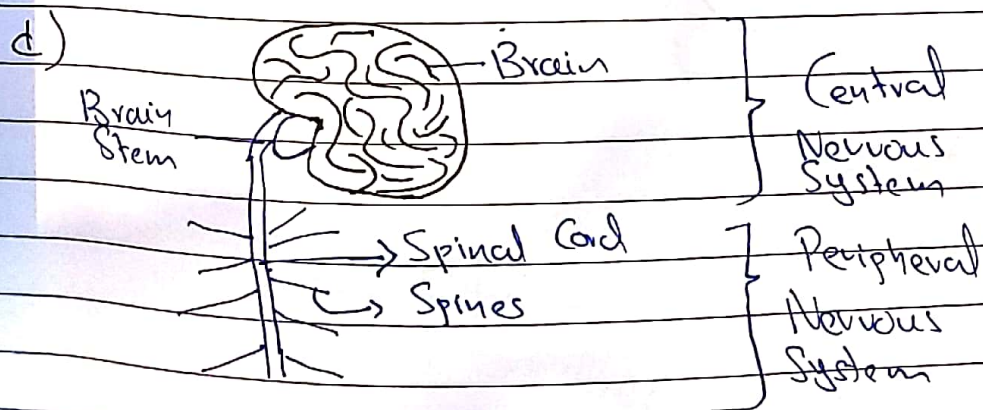
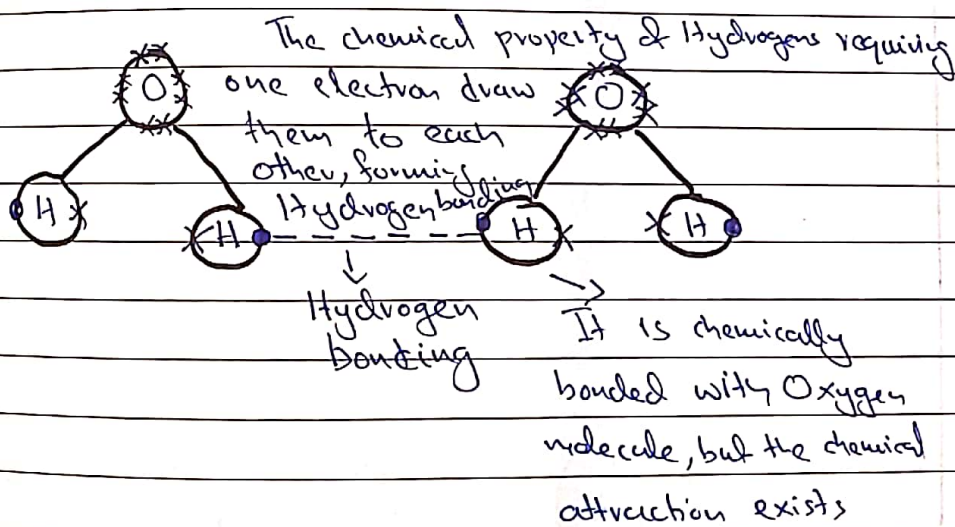
b) Energy conservation can be done through various techniques. Houses and office buildings can be insulated to keep it warm during summer and cold during winters. Hence, conserving the energy. The wide use of so renewable energy sources like solar energy, wind energy, tidal energy can be stored. In nurseries green houses conserve energy through greenhouse effect where the reflected energy from the sun could not escape, keeping the space warm.



There are various sustainable uses of energy especially in the form of renewable energy. Since the non-renewable sources are scarce, renewable energy consistently provides with energy to meet the energy needs. For example, the solar energy constantly provide energy which is stored and converted to electrical energy. Hybrid vehicles are another way of its sustainability as the battery conserves energy reducing the consumption of unnecessary fuel.

c) Hydrogen bonds

Hydrogen bonding is a form of bonding that include Hydrogen elements in two. Lets take the example of water (H_2O). Although the Hydrogen bonds are chemically attached Ionic bonding, the single Hydrogen element has a chemical bonding with Hydrogen element of another compound as shown in the figure. This is one of the reasons of H_2O molecules bonded together unless a certain amount of pressure is exhibited upon them, causing breakage.

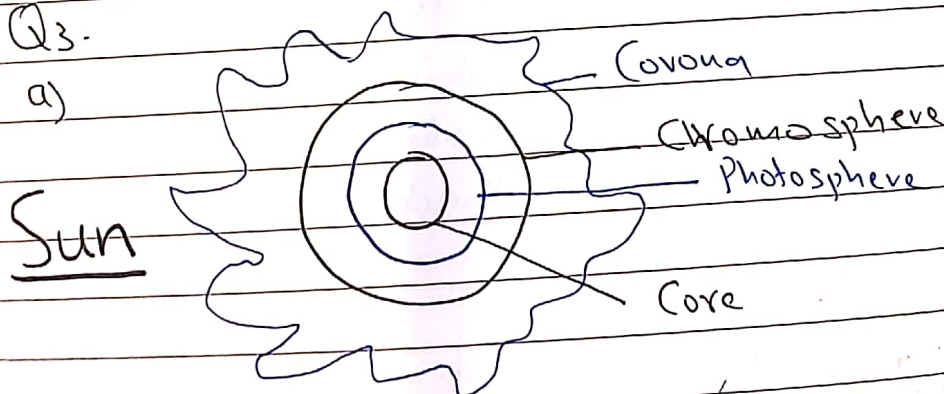


Nervous System is the intelligence system of the body that receives, analyses and responds signals in the body. It coordinates and command data with both voluntary and involuntary responses. The Central Nervous system includes the brain, brain stem and Medulla Cortex. It is responsible for memory, a thinking process, fight and flight survival instincts, etc. In addition, it commands body or voluntary muscular reaction especially in musculoskeletal region. Involuntary response generates in lower part of central Nervous system that coordinate activities such as heart ~~rate~~ beat contraction.

Peripheral Nervous system constitutes of spinal cord. It acts as a transit, responsible for transmitting information to the brain and receive electric signals for both voluntary and involuntary responses.

Q3.

a)



Core of the Sun

The core of the Sun is its hottest region with temperature in million Centigrade. The gravity exist s from this region. It is so strong that

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it prevents sun from expanding after massive energy release. The main elements are Hydrogen (92%) and Helium (8%). Through the process of Fusion, the Hydrogen elements convert into Helium, releasing massive energy.

Chromosphere

This is the upper layer of the sun with temperature of around 5000°C . Sun spots exist at this place where the temperature are relatively lower. The energy as heat and light from Corona. This is the crown shaped structure of the sun. In the process, solar winds are released which are capable of destroying the atmosphere of planets like mercury. However, Earth's magnetic region protects earth from solar winds and forms Aurora in the process.

When the hydrogen will be exhausted, the sun will ~~can~~ fuse Helium together. This would result in massive expansion of sun as the force exerted outwards gets greater than gravity. This happens as the sun becomes a dying star.

b) Tsunami

Tsunami occurs when the huge waves from the sea enters the dry land, causing flood in the region. This not only result in loss

of life, but also destruction of infrastructure, diseases, loss to economy and environmental damage.

How is it generated

Tsunami is mainly generated as a result of earthquake in the Oceanic Crust of Lithosphere.

The energy released in the process is transmitted into water. The deep oceanic current flows that gain massive speed. The energy and from the current produces a huge tidal waves. If these waves hit the land with massive speed, causing huge volumes of water entering the dry land and cause creating destructions.

Recent Tsunamis

Bangladesh, 2024

Spain, 2024

i) Environmental Pollution

Environmental Pollution is the presence of toxic/unecessary substances in the environment constituting of land, water and air. Land and Water pollution could include the presence of salt substances in solid or liquid forms such as domestic or factory waste, organic waste, plastic wastes etc. Air pollution include toxic pollutants in atmosphere that is detrimental to the ecosystem. This may include large

particles as well such as dust particles. Harmful gases such as excess lead is poisonous in excessive. Large amount of Sulphur dioxide may cause acid rain. Chemicals like CFC depletes Ozone.

Harmful effects of pollution

Pollution, in humans, causes serious health issues. Excess of Carbon dioxide or Carbon monoxide could result in complications involving lung diseases. Pollutants like smog, additionally, affects the eyes and throat. Diseases like Cholera and ~~Dysentery~~ Diarrhea prevails from dirty drinking water. Land pollution increases infestations and rodents in Metro-cities like New York. As mentioned before, Sulphur dioxide causes acid rain, harmful to plants and ~~more~~ deteriorating to marbles. For example, Taj Mahal is losing its colour due to acid rain as Sulphuric acid ~~produce~~ oxidises marbles.

Measures to curb it

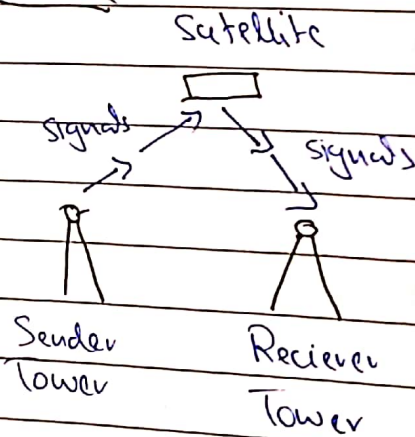
Recycling management should be introduced. Bins with recyclable wastes should be classified accordingly. People should be educated about their responsibilities in disposing recyclable wastes. International campaigns like Paris Agreement and climate conferences like the recent COP29 must provide latest breakthroughs to to ~~avoid~~ ~~also~~ minimise air pollution. Unfortunately, the

Global North agreed to contribute \$300 billion to the cause. It must be at least four figures for effective implementation of action against climate pollutants. In addition, Local govt should be empowered to tackle the pollution at smaller scales. Public-private partnership should be encouraged. For example, Qatar's waste management has been handed over to 'Safat', a public-private waste management organisation.

d) Wireless Communication

Wireless Communication is a major breakthrough in communication network, involving transfer of information from one geographical location to another without a 'wired' medium. It could travel within a city, within a region ^{and} between countries throughout the globe. The medium involves microwaves and radiowaves signals. For example, a remote transmits certain frequency of microwaves that command TV to switch a channel or increase volume. These signals can travel as fast as the speed of light.

Satellite



The signals are transmitted as ^{micro}waves to the satellite in a specified frequency. The satellite interprets the data and sends it to the targetted location. In certain events, it coordinates with other satellites to pin the location of sender as well as receiver. For example, GPS system involves coordination between various satellites to pin the exact location commanded.

Section - II

Q6 - let the three digits be x, y, z

Sum of digits

$$x + y + z = 15 \quad \text{--- (2)}$$

• let 'x' be unit digit

• let 'y' be 10th digit

• let 'z' be 100th digit

Sum of 10th and unit digit

$$x + y = 12 \quad \text{--- (1)}$$

Difference of unit digit from 10th digit

$$y - x = 2 \quad \text{--- (3)} \quad \Rightarrow$$

Substitute equation (1) into (2)

$$12 + z = 15$$

$$z = 15 - 12$$

$$z = 3$$

Elimination method to find y from equation (1) and (2)

$$x + y = 12 \rightarrow (1)$$

$$-x + y = 2 \rightarrow (2)$$

$$2y = 14$$

$$y = 7$$

Substituting ' y ' in equation (1) to find x

$$x + 7 = 12$$

$$x = 12 - 7$$

$$x = 5$$

Therefore, ~~xyz~~ xyz should be 573

- a) b) let small pizza be 's'
let medium pizza be 'm'
let large pizza be 'l'

If there is one slice per person, the total slices will be 18.

$$\text{Total slices} = 18$$

$$\text{Total weight} = 18 \times 40$$

$$= 720g$$

Number of slices in smaller pizza

$$\frac{2}{9} \times 18 = 4 \quad \therefore 4 \text{ slices in smaller pizza}$$

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*Assuming the size of slice is same for all the pizzas

$$\text{Cost/slice} = \frac{320}{4} \Rightarrow \frac{\text{Total price of smaller pizzas}}{\text{Total slices of smaller pizzas}}$$
$$\text{Cost/slice} = 80 \text{ Rs/-}$$

$$\begin{aligned} \text{Total Cost} &= \text{Total slices of all pizzas} \times \text{Cost per slice} \\ &= 18 \times 80 \\ &= \text{Rs. } 1440 \end{aligned}$$

Therefore the total cost of pizzas are Rs 1440 while its total weight is 720g.

c) Diameter = 6 cm

$$\begin{aligned} \text{Radius} &= \frac{\text{Diameter}}{2} \\ &= \frac{6}{2} = 3 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Circumference of Circle} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 3 \\ &= 18.85 \text{ cm} \end{aligned}$$

• Therefore, the Circumference of Circle is 18.85 cm and Area of circle is 28.28 cm.

$$\begin{aligned} \text{Area of Circle} &= \pi r^2 \\ &= \frac{22}{7} \times 3 \times 3 \\ &= 28.28 \text{ cm} \end{aligned}$$

b) d) i)

Position:	1 st	2 nd	3 rd	4 th	5 th	6 th
Step 1:	13	24	46	90	178	264
Step 2 (Difference)		11	22	44	88	176
Step 3 (Multiplication Series)		x2	x2	x2	x2	

From the above series, we took the differences of the consecutive numbers in Step 1.

In Step 3, we realised that the pattern form has consecutive multiplication of 2 in each of the difference identified in Step 2.

a) Therefore, the difference of 4th and 5th (88) is multiplied by 2 to attain the difference of 5th and 6th number ($88 \times 2 = 176$).

c) The difference of 176 is added to the original number in Step 1 in order to attain original 6th number. ($178 + 176 = 264$). Therefore, the 6th number is 264.

ii)

Position:	1 st	2 nd	3 rd	4 th	5 th	6 th
Step (1)	5	6	9	14	21	30
Step (2) Difference		1	3	5	7	9

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From Step 2, we identified the pattern of the numbers. The difference of the numbers were odd consecutive numbers in ascending order.

Therefore the difference in 5th and 6th number will be the ascending odd number next in the consecutive range of 1, 3, 5, 7 i.e., 9.

Since the odd numbers are the differences between consecutive number, 9 is added to the 5th in the series in order to obtain the missing number.

Hence the 6th number is $(21+9)$ **30**.

Q8-

a) let length be (x)

$$\therefore \text{Width} = x \times 60\%$$

$$= 0.6x$$

Therefore the dimensions of the room are 15 feet long and 9 feet wide.

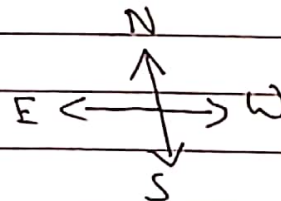
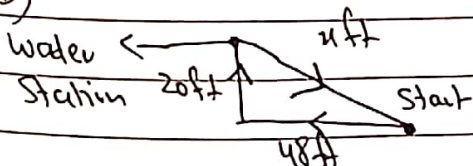
$$\text{Since length} = 15 \text{ ft}$$

$$x = 15$$

$$\text{Width} = 0.6 \times 15$$

$$= \frac{6^3}{10} \times 15^3 = 9 \text{ ft}$$

b)



let the distance from 'Water Station' to starting point be (x)

Using Pythagoras Theorem

$$\text{Hypotheneuse}^2 = \text{Base}^2 + \text{Height}^2$$

$$H^2 = B^2 + A^2$$

$$\text{Base} = 48$$

$$\text{Height} = 20$$

$$\text{Hypotheneuse} = x$$

$$x^2 = 48^2 + 20^2$$

$$= 2304 + 400$$

$$x^2 = 2704$$

Since 2704 is closest to the square of 50 and 4 is the square of 2, the exact square root of 2704 is 52

$$\therefore x^2 = \sqrt{2704}$$

$$x = 52$$

Therefore, the total distance from water station back to the starting point is 52 feet.

$$c) \quad \text{Average} = \frac{\text{Total marks}}{\text{Total Students}}$$

$$52 \cdot 15 = \frac{\text{Total marks}}{40}$$

$$20860 = \text{Total marks}$$

Correcting the error by deducting 49 and adding 85

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$$\text{Total Correct Marks} = 2086 - 49 + 85$$

$$\text{Total marks} = 19/5/ 2122$$

$$\text{Average (new)} = \frac{2122}{20} = 53.05$$

$$d) \text{ Probability} = \frac{\text{The probable item}}{\text{Total items}}$$

$$= \frac{25}{25+37+13} = \frac{5}{65}$$

$$\text{Probability (chicken pizza)} = \frac{5}{13}$$