

(a) Sara walked 10m = $A \rightarrow B$

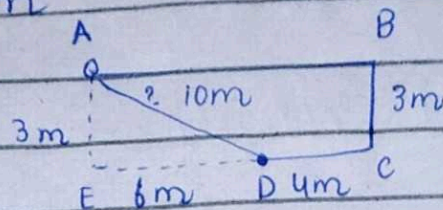
Towards Right $B \rightarrow C = 3m$

Again Right $C \rightarrow D = 4m$

Distance $D \rightarrow E = 6m$

$A \rightarrow E = 3m$

$A \rightarrow D = ?$



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

$$(H)^2 = (6)^2 + (3)^2$$

$$\sqrt{H}^2 = \sqrt{36+9}$$

$$H = \sqrt{45} = 3\sqrt{5}$$

(b) Perimeter of a regular Octagon = ?

(S) Each side = 5cm

$\theta = ?$

Perimeter of a regular polygon = $n \times s$

$$= 8 \times 5$$

$$= 40cm$$

Now,

determining the sum of interior angles:-

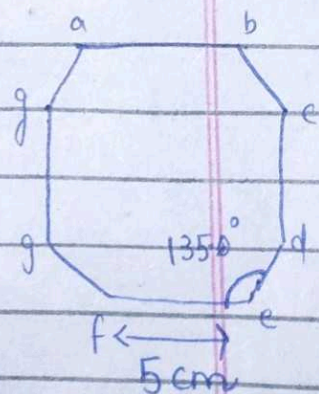
$$S = (n-2) \times 180^\circ$$

$$S = (8-2) \times 180^\circ$$

$$S = 6 \times 180^\circ = 1080^\circ$$

Each interior angle:

$$A = \frac{1080}{8} = 135^\circ$$



(c) No. of green balls = 6
No. of yellow balls = 10

Probability of a yellow ball = $\frac{\text{No. of yellow balls}}{\text{Total balls}}$

$$P(\text{Yellow}) = \frac{10}{6+10} = \frac{10}{16} = \frac{5}{8}$$

(d)

MADRAS
NBESBT

BOMBAY = ?

CPNCBZ

Coding Pattern is to shift
Each Alphabet "forward" once
in the Alphabetic list.

$$+1 \left[\begin{matrix} M \\ N \end{matrix} \right] +1 \left[\begin{matrix} A \\ B \end{matrix} \right] +1 \left[\begin{matrix} D \\ E \end{matrix} \right] +1 \left[\begin{matrix} R \\ S \end{matrix} \right] +1 \left[\begin{matrix} A \\ B \end{matrix} \right] +1 \left[\begin{matrix} S \\ T \end{matrix} \right] +1$$

So, B O M B Y Y
C P N C B Z

Q.7:

a) Find the Missing term:

(i) 11, 13, 17, 19, 23 (Prime Numbers)

(ii) 10, 28, 91, 370, 1855

$$10 \times 2 + 8 \quad 28 \times 3 + 1 \quad 91 \times 4 + 6 \quad 370 \times 5 + 5$$

b) Total shirts bought = 35
 Each shirt price = 280 Rs.
 Each sold price = 308 Rs.
 Each shirt profit = 28 Rs.
 Profit of Total shirts = 28×35
 $= 980$ Rs
 $\% \text{ age profit} = \frac{980}{35 \times 280} \times 100$
 $= \frac{980}{9800} \times 100$
 $= 10\%$

(d)
 Average height of 30 boys = 150 cm
 Wrongly copied value = 135 cm
 of 165 cm

$$\frac{\text{Total Sum}}{\text{No. of Students}} = \text{Average}$$

$$\begin{aligned} \text{Total Sum} &= \text{Average} \times \text{No. of Students} \\ &= 150 \text{ cm} \times 30 \\ &= 4500 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Corrected Sum} &= 4500 - 135 + 165 \\ &= 4530 \text{ cm} \end{aligned}$$

Now, Calculate the correct mean:

$$\text{Average}_{\text{corrected}} = \frac{4530 \text{ cm}}{30} = 151 \text{ cm}$$

(e)

$$IQ = ?$$

Actual age = 10 Years

Chronological age = 12 Years

$$IQ = \frac{\text{Actual (mental) Age}}{\text{Chronological age}} \times 100$$

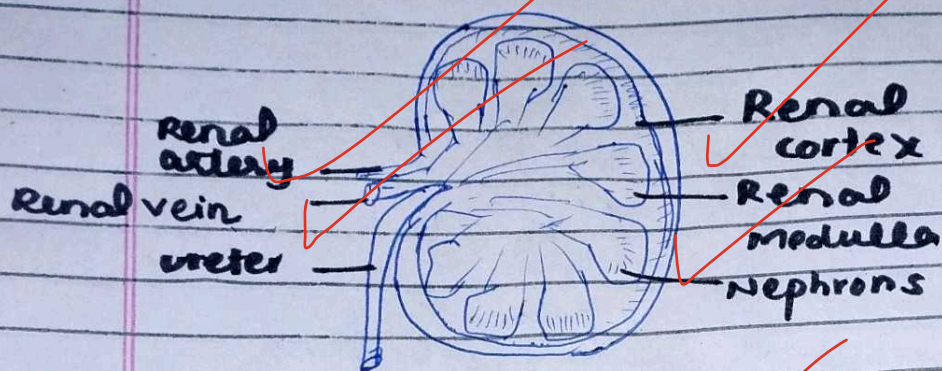
$$IQ = \frac{10}{12} \times 100$$

$$IQ = 0.83 \times 100 = 83.3 \text{ IQ}$$

Q.05

(a) Structure of Kidney

Kidneys are red-dark, slightly flattened organs about **10cm** long, **5cm** wide and each weigh **270g**. They are below the diaphragm, Protected by at least two ribs. Kidneys are covered by **peritoneum** and rest against the abdominal muscle. Each kidney is **bean shaped**. Outer surface is convex and inner is concave. The inner surface has deep notch called **hilus**. The ureters, renal artery, renal vein and nerves enter the kidney. Each kidney is composed of trillions of minute structures called **Nephrons**.



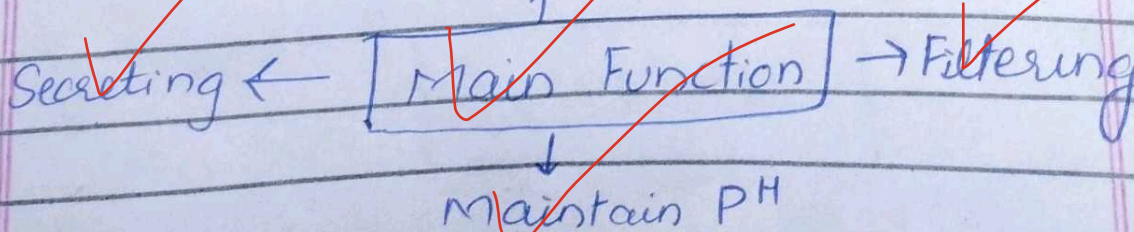
Ureter conducted **urine** from the kidney to the urinary bladder. Urethra conducted urine from bladder to penis or vagina. Bladder can store **1 liter** of urine. Urethra in females are **2-3 cm long**, while in males it is **20 cm long**.

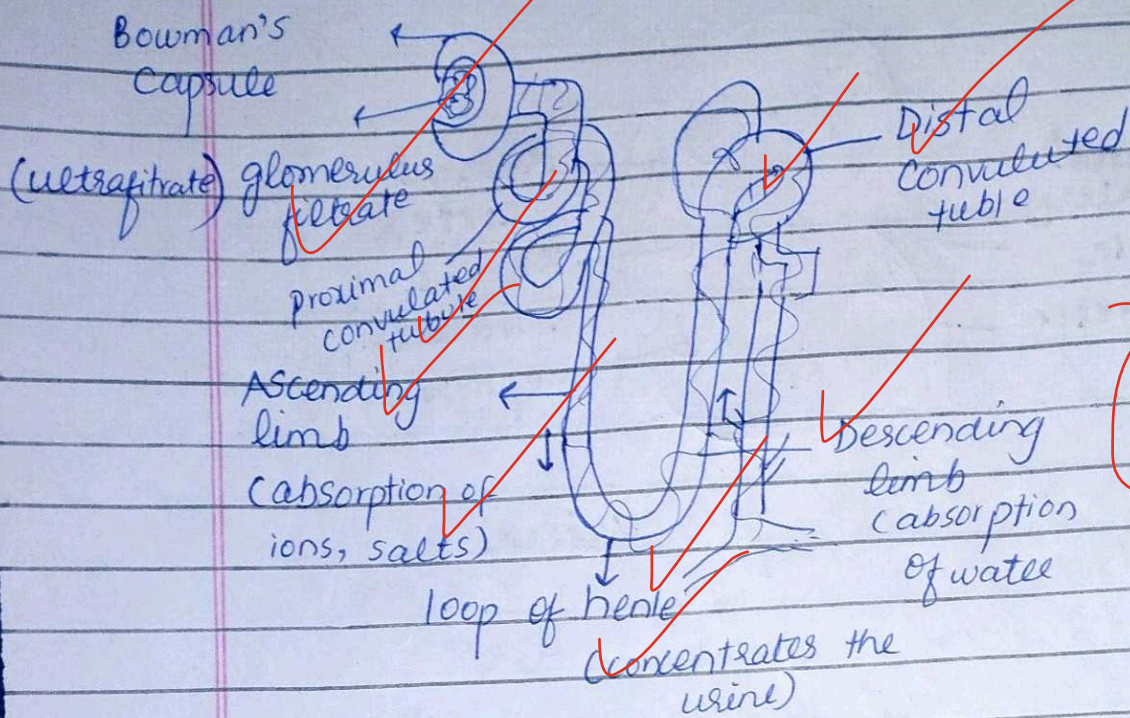
Nephrons:

Basic structural and functional unit of kidney. It filters urine by concentrating and diluting, absorbs useful nutrients such as glucose, ions, RBCs and absorb excess water. Each nephron is **3cm** in length.

It has Bowman's capsule, glomerulus filtrate, Proximal and distal convoluted tubule, loop of henle and capillaries.

Reabsorption (glucose, ions, amino acids)





(b) Renewable Energy Sources under CPEC

ee Renewable energy resources are those which once run out can be replenished again or regenerated after consumption."

CPEC defined and described renewable energy resources are:

Solar Energy

Wind Energy

Hydro Energy

Wind
Biomass Energy

1- Solar Energy

Energy generated from sun that harness for various domestic, industrial and other consumptive purposes called solar energy.

a) Active Solar energy:

Solar energy utilized by reorienting the commercial buildings, designing the buildings and using such thermal materials that can store and actively use the solar radiations.

b) Passive Solar energy:

Solar energy stored in the form of storage devices

Photo voltaic cells

Thermal collector cells

In everyday life, houses, institutes and factories install solar plates to capture solar energy and stored in batteries for later use.

2) Wind Energy:

Wind serves as a purposeful source of energy. It is utilized to turn turbines connected to generators. On average, wind can produce **6 kW-10 MW** energy. It can generate for various purposes. Wind turbines are installed on **high altitudes** and **offshore**, where wind speed is high, it is a cheap, renewable source of energy as per described by CPEC.

(3) Hydropower:

Hydropower is the largest renewable source of energy, it is generated by slow or streamline flow of water. It is a better source of energy than wind. Water is **800 times denser** than air.

Reservoirs are created to generate, store water, electricity.

Micro hydroelectric dams

Macro hydroelectric dams

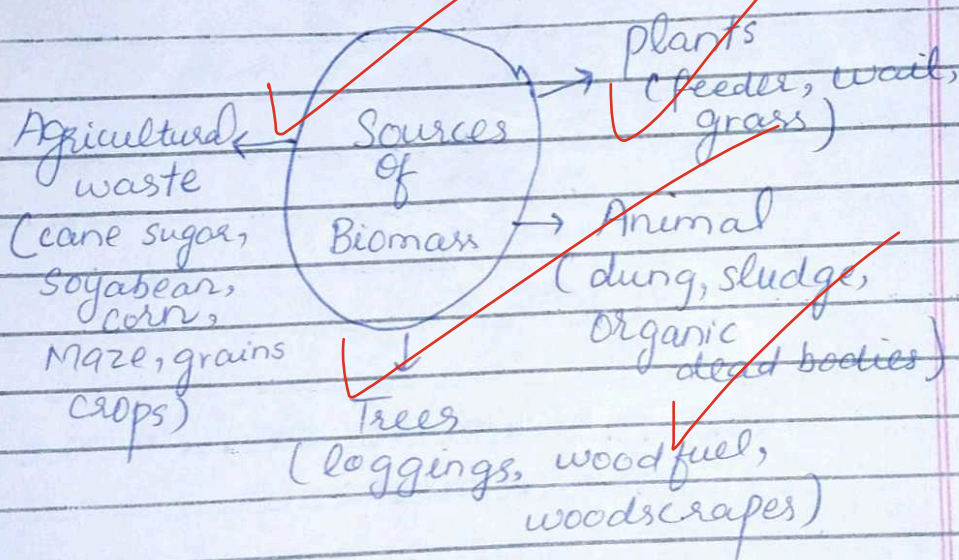
Tidal power

Reservoirs, are structures

manufactured for generating electricity from water.

4) Biomass or Biofuel:

Biomass of plants and animal wastes are used to generate **Bioethanol, Biodiesel or Biogas**, by hybrid plants, poplar, grass, feeder, wood fuel, wood scapes, wood loggings, agricultural waste, corn waste.

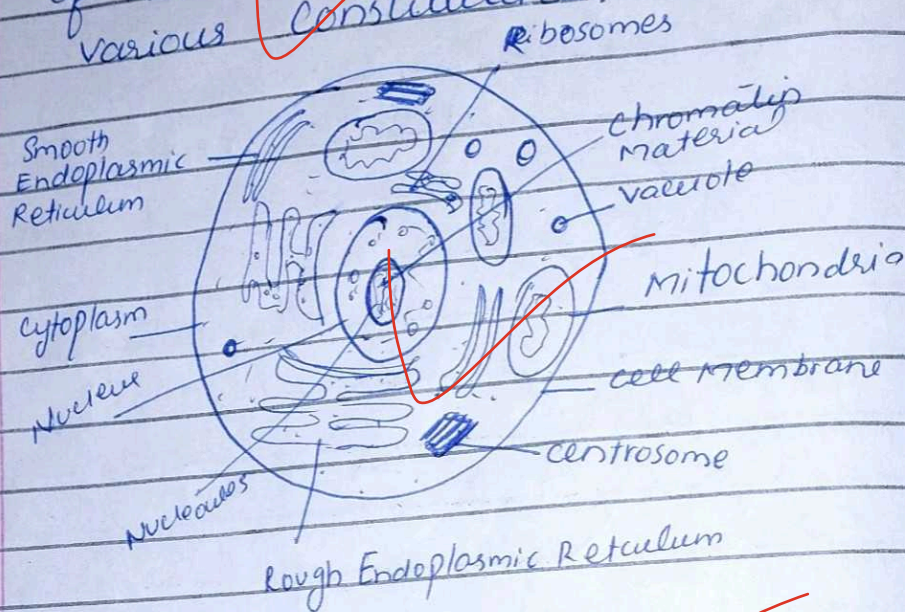


(C) Different Parts of Cell in human Body

Human body is made of different Organs, Organs are made of tissues and tissues are made of cells.

"Cell is the basic structural and functional unit of life"

A human body is composed of trillions of cells. Cell has various constituent.



a) Cell membrane or Plasma membrane

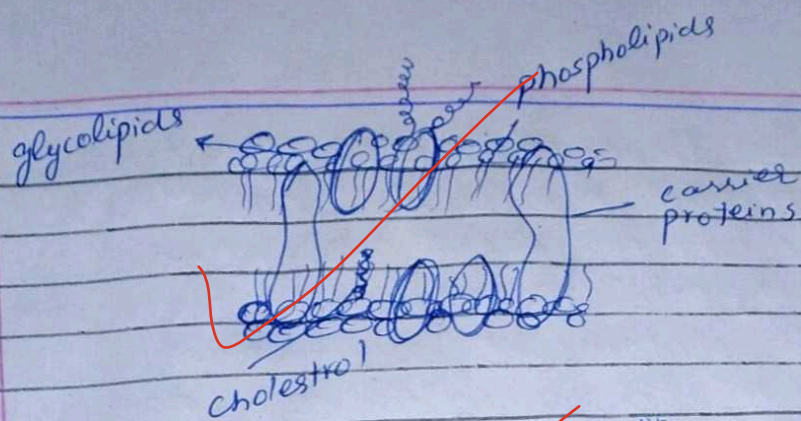
Outer membrane of a cell.

Made up of Phospholipids, Cholesterol, proteins carbohydrates

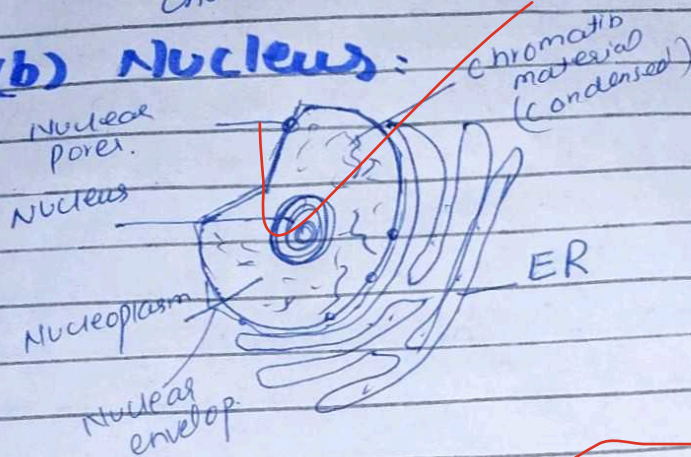
Fluid Mosaic Model describes the structure of Plasma Membrane

It contains different proteins e.g., myelin (18%), lipid is 76%.

Its functions are transport of material, maintenance of cell and its concentration, it also differentiate the permeation.



(b) Nucleus:



Nucleus is surrounded by nuclear Membrane which separates the inner material from outer.

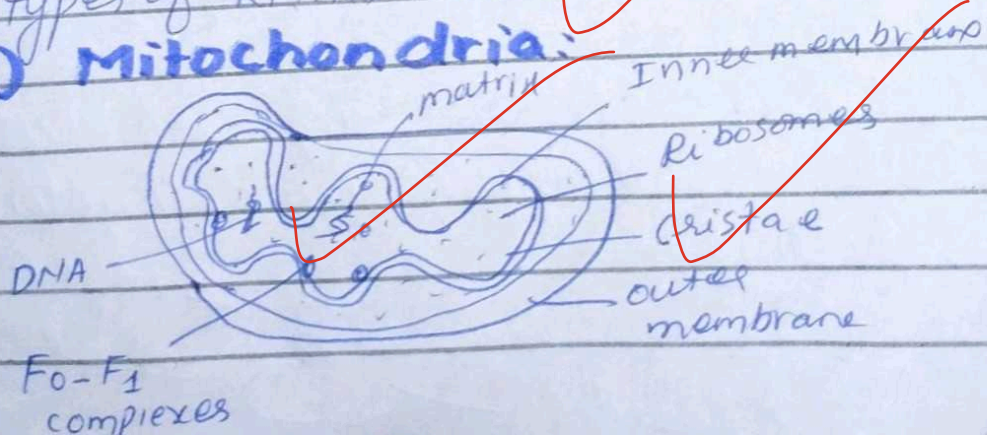
Nucleolus is a dark condensed body in which DNA replication and transcription takes place.

Nuclear pores are for transport of material. Endoplasmic Reticulum surround it which provides

Ribosomes for protein manufacturing. Nucleoplasm is a soluble nuclear sap.

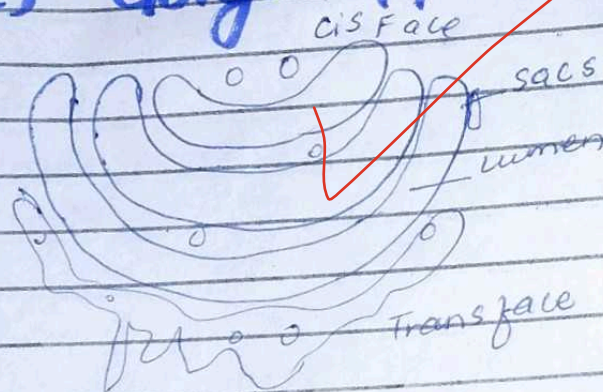
Nucleus performs hereditary functions and form three types of RNAs, mRNA, tRNA, rRNA.

(c) Mitochondria:



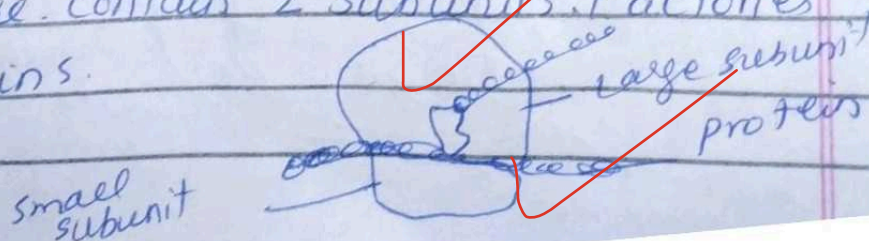
Power house of the cell. Many important metabolic processes take place here, aerobic respiration, fatty acid metabolism. Mitochondria also contain its DNA and RNA. Energy in the form of **ATP** is absorbed from mitochondria and again generation of ATP. It has cristae, large number of enzymes, co-enzymes, organic and inorganic salts.

(d) Golgi Apparatus:

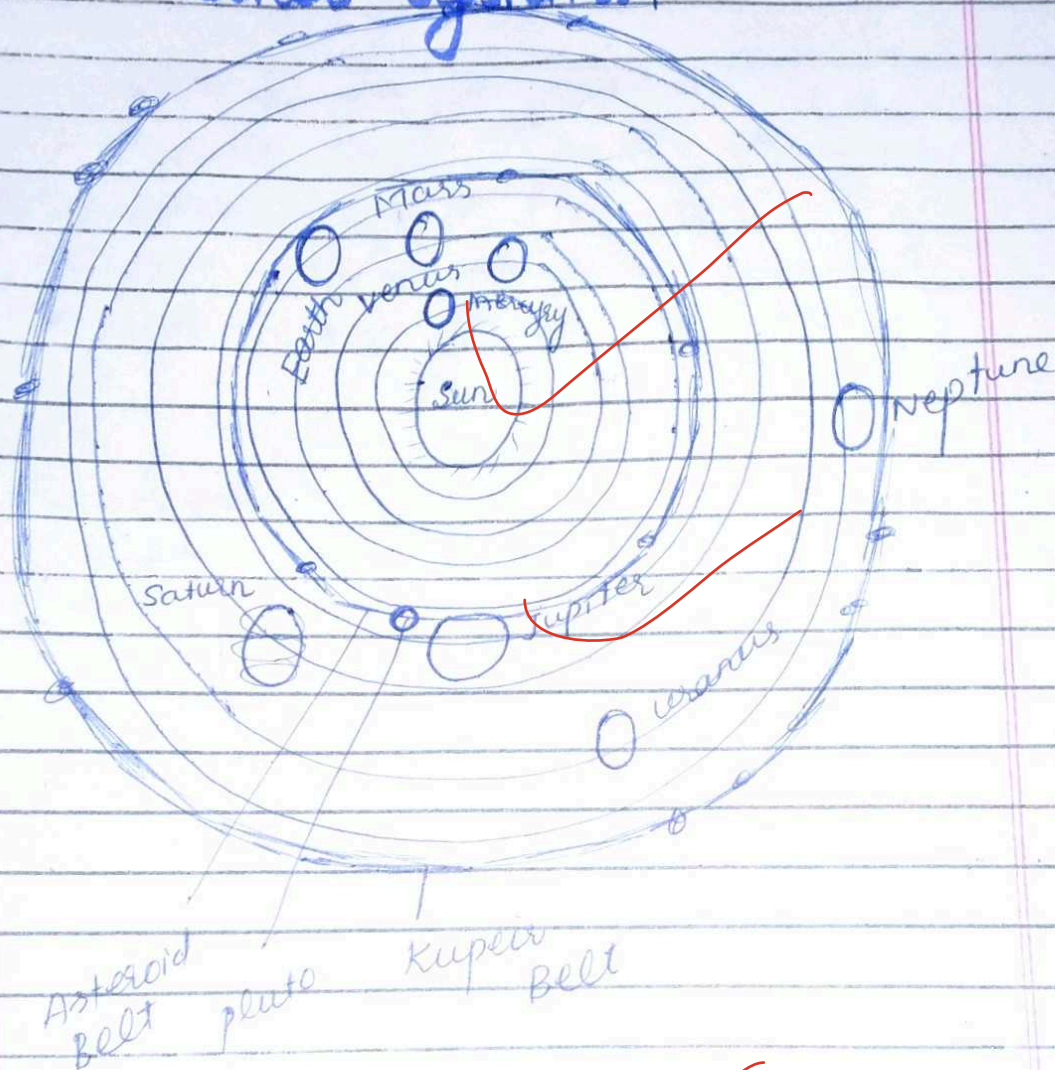


Golgi complex is an interconnected system of tubules. It is concerned with **Cell Secretions**. Ribosomes synthesize protein part, it is transferred to Endoplasmic Reticulum, Golgi apparatus converts it into finished products. Its function is **transportation, formation of glycolipids,** outside the cell.

(e) **Ribosomes:** Tiny granular structure. Contain 2 subunits. Factories of Proteins.



(d) Different parts of Solar Systems:



- Mercury has No Moons
- Venus has No Moons
- Earth has one Moon "Luna"
- Mars has two small Phobos and Deimos
- Jupiter **Largest** has **95 Moons**, but four largest Moons, one is famous "Galilean Moon", Ganymede, Io, Europe, Callisto
- Saturn has **140 Moons** major is Titan
- Uranus has **27 Moons**
- Neptune has **14 Moons**, largest Moon Triton

other celestial Bodies:

Sun at the center is the largest star.

(2) Dwarf planets, such as Pluto and Ceres.

Asteroid Belts region between Jupiter and Mars.

Comets icy bodies

Meteorites, stoney rocky bodies

Constellation, group of stars

Q4:

(a)

(i)

Cyclone

Large Rotating Storm formed over Warm oceans,

larger width. (Diameter 100s of km)

Tornadoes

Small, intensely rotating column of air formed over

land or ocean (diameter 100's of m)

Severe thunderstorm

(ii) Hypocenter:

underground point where earthquake occurs and originates

Epicenter:

Epicenter is the point

directly above the hypocenter
on the Earth's center
surface.

(iii) GPS

Global positioning System, Satellite
based system used to
determine precise location.

GIS

GIS, Geographic information
System for storing, analyzing,
Manipulating in system, information
on computer.

(iv) RAM

Random Access memory, volatile
memory used for active
processing of a system.

ROM

Read only memory, permanent,
Non-volatile memory that
Stores essential instructions.

(v) Pesticides

Pesticides are chemical substances
used to kill, prevent, repel or
control all types of pests.

Insecticides

Subtype of pesticides used to
kill insects only or
repel, control insects.

(d) Balanced diet:

Balanced diet provides the body with right proportion of nutrients including carbohydrates, proteins, fats along with vitamins, minerals and water.

Key Components:

Carbohydrates

Should make about 40-60% of daily calorie
Dietary fibres Main source of energy
provide 3.9 calories/g of energy.

When carbohydrates are broken down glucose is produced. Glucose is stored in the form of glycogen in animals and starch in plants.

Key Components

Vitamins and Minerals are essential for body's metabolism. There are fat soluble and water soluble vitamins.

A, D, E, K, & B, C

Vitamins & Minerals & Water

Minerals are micro and macro such as Ca, Na, K, Zn. Water require for preventing dehydration.

Proteins

Should be 10-30% of daily calories
Essential to growth and repair of muscles.

There are four levels of proteins primary, secondary, tertiary, quaternary, provide structural, functional and transport function.

Should be 20-30% of total energy

Fats are HDL (good) LDL (bad). They are Saturated and unsaturated from animal fats and plant oil.

Fats

They provide energy and insulation to the body.

3.5

(c)

Solid Waste Management

Solid Waste management according to European management standards provide different systems in hierarchy to manage domestic, industrial and Agricultural waste.

(a) **Pyrolysis**: High temperature decomposition of matter in the **absence** of Oxygen. Products are mixture of gases such as CH_4 , CO , a liquid called biofuel and carbon-rich residue is obtained. Temperature must be **400-1000°C**. It converts waste into valuable resources and minimizes environmental impact.

(b) **Incineration**: High temperature burning of waste in the **presence** of Oxygen. Products are ash and flue gas. The heat generated can be used to produce energy. Temp. must be **above 850-1000°C**. It rapidly reduces the volumes of waste and can

(c) **Composting**: An aerobic biological process where microorganisms decompose organic matter and convert into nutrient-rich organic matter under controlled conditions (air, moisture, temp)

3.5 Products later can be used as fertilizers. It requires proper moisture (40-60%) and aeration. It can reduce Green house gas emission from Landfills.

(b) **volcanic eruption**

A volcanic eruption happens when **Magma** deep within the earth rises and forces its way through fissures and vents.

Buildup of **pressure** from deep within earth cause eruption. because magma is less dense than surrounding solid rocks.

Process

(a) **Magma Formation:**

Deep within earth, high **radioactive** substances cause rocks to melt into a fluid called **magma**. Being lighter than surrounding it rises upward and collects in an underground reservoir.

(b) **pressure build up:**

A Magma rises, it contains dissolved gases, these gases remain trapped but as the magma gets closer to surface, gases start bubble up.

(c) **Explosive vs. effusive:**

Thick, silica rich magma traps gas bubbles and erupts it with violent explosion. Runnier and less thick just effuse slowly does not cause eruption.

3

