

PART - II

SECTION - I

Q. no-3

(a)

Why cells form organelles? Discuss mitochondria in a human cell.

Answer

Cells form organelles to divide their functions efficiently, allowing different biochemical processes to occur efficiently and simultaneously without interference. Each organelle performs a specific role - for example, the nucleus controls genetic information, ribosomes make proteins, and mitochondria produce energy.

Mitochondria are a double-membraned organelles known as the power houses of the cell. They generate adenosine triphosphate (ATP) through cellular respiration - mainly by breaking down glucose and oxygen. They contain their own DNA and ribosomes, allowing them to replicate independently. Mitochondria are abundant in energy-demanding cells like muscle, liver, and nerve cells.

and play roles in metabolism, cell signaling and apoptosis or cell death.

Q. (b) What is doping? Discuss different types of semi conductors.

Doping is the process of intentionally adding controlled amount of impurities into a pure semiconductor such as silicon or germanium, to enhance its conductivity. The impurity atoms modify the charge carrier concentration.

Different types of semi conductors are :

1- Extrinsic semi-conductor — doped semiconductor, further divided into n-type semiconductor and p-type semiconductor. While n-type semiconductor is formed by adding pentavalent impurities and p-type semiconductor is formed by adding trivalent impurities.

2- Intrinsic Semi Conductor — Pure semiconductor with few charge carriers — where as conductivity depends on temperature.

© Merits & Demerits of volcanic eruption:

Merits:

- Valuable minerals and gems, for example ~~sulphur~~ sulfur, copper ~~at~~ pumice are often found near volcanic regions.
- Volcanic ash makes soil fertile, and ~~proton~~ promoting agriculture.
- Geothermal energy from volcanic activity can be used for power generation.
- Eruption lead to formation of new landforms like islands and mountains.

Demerits:

- loss of life and property due to lava flows, ash and toxic gases
- Air pollution and climate disruption caused by volcanic ash and sulfur dioxide.
- Destruction of forests, crops, and wildlife habitats.
- Volcanic eruptions can trigger earthquakes, tsunamis, or acid rain.

in nearby areas.

④

What is dengue? Discuss symptomology, causative agents & remedies.

Dengue is a severe viral infection caused by the Dengue virus. It is transmitted primarily by the *Aedes Aegypti* mosquito which bites during the daytime. There are four strains from Den-1 to Den-4 and infection with one type doesn't give immunity to others.

Symptoms:

High fever upto 104° Fahrenheit, severe headache, muscle and joint pain, Nausea, vomiting, skin rash and pain behind the eyes. In severe cases it causes bleeding gums, low platelet count and dengue shock syndrome and eventual death.

Remedies:

No specific antiviral treatment - supportive care only. Severe cases require hospitalization for platelet monitoring and fluid replacement.

Q. No. 4

@ Write a note on plant kingdom "Chlorophyll".

Chlorophyll is a green pigment in the chloroplast of plants, algae and some bad bacteria. It plays a vital role in photosynthesis, the process by which plants convert sunlight, water and carbon dioxide into glucose and oxygen. Chlorophyll absorbs light mainly in the blue and red regions of the spectrum and reflects green light, giving plants their color. There are several types of chlorophyll; Chlorophyll a ~~and~~ — main pigment and Chlorophyll b — accessory pigment — are most common in higher plants. Without chlorophyll, plants cannot produce food or release oxygen, which makes it essential for life on Earth.

⑥ Role of Ribosomes in Protein Synthesis:

Ribosomes are small, spherical organelles made of rRNA and proteins.

They are found freely in the cytoplasm or attached to the rough endoplasmic reticulum. Their main function is protein synthesis.

During the process of protein synthesis, ribosomes read the genetic code carried by mRNA and use it to assemble amino acids in the correct sequence with the help of tRNA. The amino acids are joined by peptide bonds, forming a polypeptide chain that folds into a functional protein. Hence, ribosomes are often called the "protein factories" of the cell.

⑦ Different methods of solid waste management:

- 1- Recycling or reprocessing materials like paper, plastic, and metal for reuse.

2 - Waste-to-Energy - converting waste materials into usable forms of energy.

3 - Biological decomposition of organic waste i.e., food and plants into nutrient-rich manure.

4 - Landfilling - Like disposal of waste by burying it in specially designed areas.

5 - Burning waste at high temperatures to reduce volume and sometimes to produce energy.

6 - Minimizing waste generation by reducing consumption and using eco-friendly products.

④ - Define the terms:

1 - Biofuel - Fuels produced from biological sources such as plants and animal waste, for example ethanol, biogas, bio-diesel &c. Biofuels are renewable.

and reduce dependence on fossil fuels.

2- **Adulteration** — It is —
the mixing of inferior, harmful or unauthorized substances with food, fuel or medicine to increase profit, reducing quality & safety.

3- **Hydrosphere** — The water component of Earth including oceans, rivers, lakes, glaciers and groundwater — covering about 71% of the planet's surface.

4- **Troposphere** — The lowest layer of Earth's atmosphere upto 12 km ~~approx~~, where weather changes occur and most air mass exists.

5- **Isotopes** — Isotopes are atoms of same element having the same number of protons but different number of neutrons, hence different atomic masses. For example: Carbon-12 and Carbon-14.

SECTION-II

Q.no- 6

(b) Solution:

(a) Price of the camera = \$200

(b) Discount = 25% of 200

$$\Rightarrow 200 \times 0.25 = 50$$

So after discount

$$200 - 50 = 150$$

(c) Sales tax = 6% = 0.06

$$150 \times 0.06 = 9$$

$$\begin{array}{r} 150 \\ 0.06 \\ \hline 9.00 \\ 9.00 \\ \hline 159.00 \end{array}$$

Total amount paid =

$$150 + 9 = \boxed{159}$$

Answer.

(c) Solution:

Distance = 36 km

Speed = 18 km/hr

Start time = 1 p.m.

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{36}{18} = 2 \text{ hrs.}$$

Adding time = 2 hrs

The bicycle reaches 3:00 p.m.
at $\rightarrow$

Answer.

Q Unscramble math terms:

i. STSTAICITS



(i) Statistics

ii. LGEBMAR



(ii) Algebra

Q

Q. no. 7

(a)

Solution :

Diameter = 14 cm

Radius = $14 \div 2 = 7$ cm

Formula for volume of sphere :

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

$$V = \frac{4}{3} \times \frac{22}{7} \times (7)^3$$

where $7^3 = 343$

$$\text{So, } V = \frac{4}{3} \times \frac{22}{7} \times \frac{343}{1}$$

$$V = \frac{4}{3} \times 22 \times 49$$

$$V = \frac{4}{3} = \frac{1078}{1} = \frac{4312}{3}$$

$$V = 1437.33 \text{ cm}^3$$

Answer

$$\begin{array}{r} 6 \\ 49 \\ \times 7 \\ \hline 343 \end{array}$$

$$\begin{array}{r} 49 \\ \times 22 \\ \hline 98 \\ 980 \\ \hline 1078 \end{array}$$

$$\begin{array}{r} 1437.33 \\ 3 \overline{) 4312} \\ \underline{3} \\ 13 \\ \underline{12} \\ 12 \\ \underline{11} \\ 9 \\ \underline{9} \\ 22 \\ \underline{21} \\ 10 \end{array}$$

(b)

Solution:

Total savings = Rs. 25,000

Ratio = 1:2:3:4:5

Total no. of parts ↓

$$\Rightarrow 1+2+3+4+5 = 15$$

$$\text{value of one part} = \frac{25,000}{15}$$

$$= 1,666.67 \text{ (Approx.)}$$

Smallest share = 1 part

$$= \boxed{1666.67 \text{ Rupees}}$$

Approx.

$$\begin{array}{r} 1666.6 \\ 15 \overline{) 25000} \\ \underline{25000} \\ 0 \end{array}$$

(c)

Spot the Error / Complete the Series:

(i) 2, 6, 18, 54, 162, 486 (which number doesn't fit?)

$$2 \times 3 = 6 \checkmark$$

$$6 \times 3 = 18 \checkmark$$

$$18 \times 3 = 54 \checkmark$$

$$54 \times 3 = 162 \checkmark$$

$$162 \times 3 = 486 \checkmark$$

• No error is found in the series.

(ii) 3, 5, 7, 11, 13, 17.

A series of Prime Numbers.