

General Science and Ability Part - II Section - I

Q No 3 (a)

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

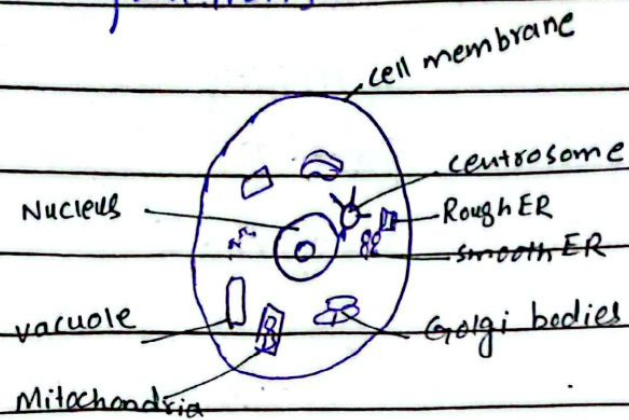
Ans

Cell is the basic structural and functional unit of life. When different kinds of cell with different functions combine together they form tissues and inside cell there are different organelles that perform a particular set of functions. All organelles are present outside the nucleus of cell and are present in the cytoplasm of cell to give cell particular structure.

DAY: _____

DATE: _____

and functions.



Animal cell

Centrosome, ER, Golgi bodies, and mitochondria are cell organelles performing specific functions.

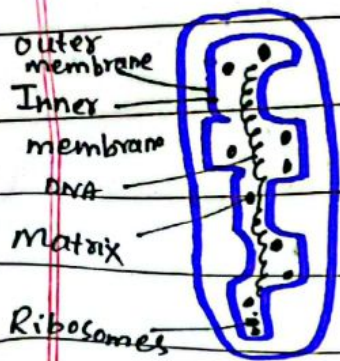
Mitochondria:

Mitochondria is known as power house of cell and it is an organelle where step-by-step oxidation of glucose takes place to produce ATP molecules.

Functions of Mitochondria:

- produce Energy
- Helps in building certain parts of blood and hormone.
- Involved in cell signaling, growth.

and programmed cell death (apoptosis)



- production of ATP
- calcium balance
- Regulation of immunity
- cell death and renewal (autophagy)

Mitochondria

Q no 3 (b)

What doping? Discuss different types of Semiconductors.

Ans

Doping:

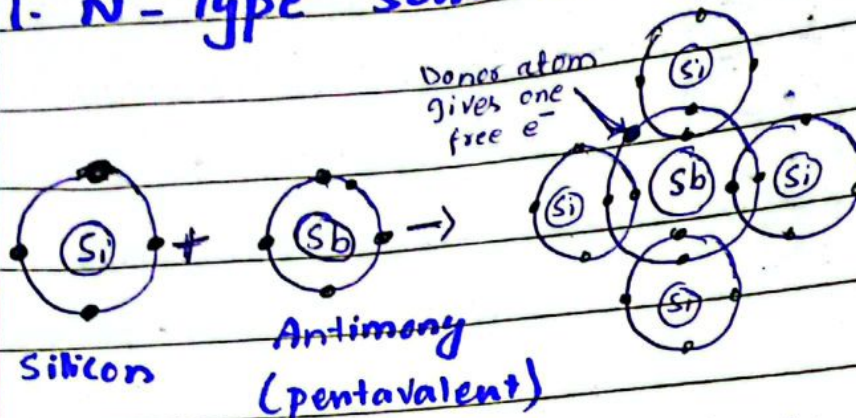
Doping is a term referred for addition of some impurity in ^{pure} semiconductor to increase its conductivity, strength and functions.

It is essential for creating electronic devices like transistors and diodes with enhanced functions.

This creates two types

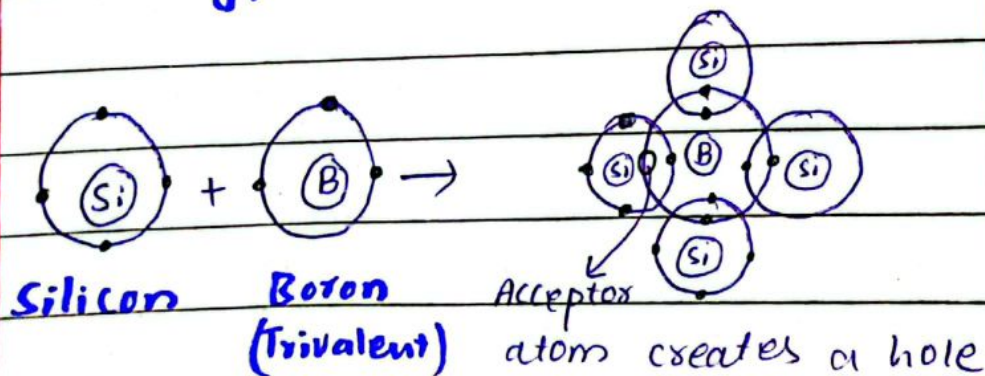
of Semiconductors which are given below.

1. N-Type Semiconductor:



Here impurity like Sb is added in pure Silicon and it gives free e^- in Semiconductor which increases its conductivity.

1. P-Type Semiconductor:



Here boron is added which has 3 valence electrons so it will create hole and that hole will make conduction possible.

QNO3 (c)

State some of merits and demerits of volcanic eruption:

Ans

Volcanic Eruption:

Magma forms when a part of upper mantle and lower crust melt. Volcano is a vent or opening through which magma or dissolved gases are discharged out.

De-Merits of Volcanic Eruption:

1. **Environment Effects**
 - Destruction of Forest
 - Pollution of air
 - Volcanic winter
2. **Human's loss**
 - Life loss
 - Property loss
 - Displacement of population
 - Health problems
- Economic Effect**
 - Damage to agriculture
 - Disruption to air travel
 - Infrastructure loss

DATE: _____

DAY: _____

Merits of volcanic Eruption

- positive Geological

effects.

- New landforms
- Soil fertility
- New plant species form
- Provide mineral resource
- Provide Geothermal

energy.

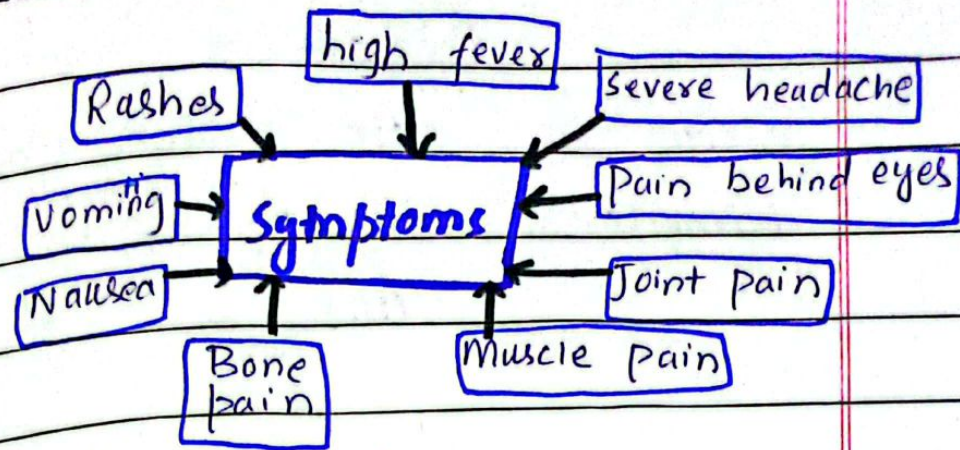
Q no 3 (d)

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

Ans:

Dengue:

Dengue is a viral infection transmitted to humans by the bite of infected mosquitoes, primarily the **Aedes aegypti** mosquito. It can be mild and resolve within a couple of days or can be severe sometimes it can be life-threatening.



Symptoms of Dengue:

- 1- High fever
- 2- Rashes
- 3- Vomiting
- 4- Nausea
- 5- Severe headache
- 6- Joint pain
- 7- Muscles pain
- 8- Bone pain
- 9- Pain behind eyes.

Causative Agents of Dengue:

- Dengue virus, a flavivirus
 - Aedes mosquito
 - Four serotypes of virus.
- i) DENV-1 ii) DENV-2 iii) DENV-3 iv) DENV-4

Remedies:

- Resting
- Staying hydrated
- Taking paracetamol
- Hospitalization in severe case.
- Avoid aspirin

Qno 4 (a)

Write a note of on Plant kingdom "Chlorophyll".

Ans

Plant kingdom is known as kingdom plantae that includes all autotrophic plants having cell wall in their cells and various organelles are present in plant cell. Chloroplast is one of the organelles in plant cell. Plants have leaves which contain Chlorophyll.

Chlorophyll

Chlorophyll is a green pigment present in plants leaves that gives green colour to the leaves. Chlorophyll absorbs sunlight and which is used by plant for photosynthesis. So it is a unique pigment present only in plants.

Functions of Chlorophyll:

- Growth regulation
- Responding to environmental stress
- Protecting cell from damage
- Giving green colour to plants
- Absorbs sunlight.

Q no 4 (b)

Describe the role of Ribosomes in protein synthesis.

Ans

Ribosome:

Ribosome is a cell organelle which is present in cytoplasm and is famous for protein synthesis. Ribosomes may be

- Present on Rough endoplasmic reticulum.
- or free in cell.

They translate messenger RNA into long chain amino acids which assemble to give proteins.

DAY: _____

DATE: _____

Role of Ribosomes in protein synthesis:

Ribosomes are involved in translation in different ways.

1- They decode genetic information in mRNA called codons.

2- Move along mRNA

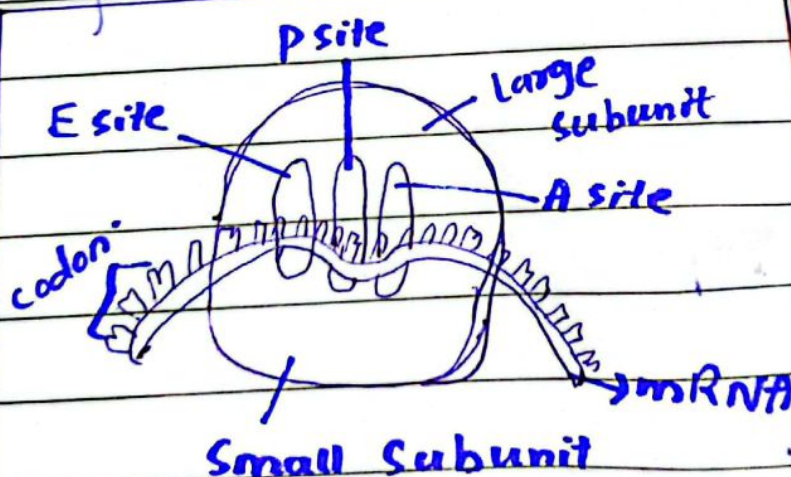
3- Recruit specific tRNA

4- form specific polypeptide bonds

5- and when stop codons

come it causes termination

step of translation



Ribosome

Discuss
of Solid waste

management
transportation
and disposal
from residential
and industrial
Different

waste
put

2- Re
can
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Q No 4 (c)

Discuss different Methods
of Solid waste Management.

Ans

Solid waste Management:

Solid waste management is systematic collection, transportation, processing, recycling and disposal of solid materials from residential, commercial, and industrial sources.

Different Methods of SWM:

1- **landfilling**: Solid waste is collected and then put deep in land to process.

2- **Recycling**: waste materials can be turned into other products and re-used.

3- **Composting**:

organic materials are broken down by micro-organisms generally by bacteria or fungi into simple forms.

DAY: _____

4- Incineration:

Burning of solid waste at very high temperature and putting it in incineration chamber. Combustion destroys organic compounds containing carbon and hydrogen.

Q no 4(d)

Define the Terms:

i- Biofuel:

Biofuel is a kind of fuel obtained from animal and plant wastes and from certain other things. It has three forms

1- Biodiesel

2- Bioethanol

3- Biogas

Biodiesel is obtained by transesterification. Biofuel reduces the carbon footprint in atmosphere and

DAY: _____

DATE: _____

is comparatively environmental friendly. It can be cheap source of energy, which is renewable.

(ii)

Adulteration:

Adulteration is a process in which food quality is deteriorated intentionally for economic profit. It can be done by adding impurity in food, extracting useful nutrients from it, or adding any kind of artificial flavoring to hide low quality.

Examples:

- Extraction of Cream from milk or yoghurt.
- Adding water in milk

(iii)

Hydrosphere:

Hydrosphere is part of earth that contains all water contents or

DAY:

water bodies. It includes all seas, glaciers, oceans, lakes, rivers etc. water move in water cycle and come to hydrosphere again.

(iv)

Troposphere:

Troposphere is the very first layer of gases around atmosphere which has altitude upto 15km and weather conditions occur here here temperature is around -60°C at tropopause which is boundary between troposphere and ~~stratosphere~~ stratosphere

(v)

Istopes:

Istopes are elements with atoms having same atomic numbers but different atomic masses. They have same number of protons and different number

of chem
differen

Examples:

3-H- istopes: ^1_1H
Protium

Carbon has
 $^{12}_6\text{C}$

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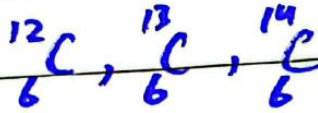
of neutrons. They have same chemical properties but different physical properties.

Examples:

3-H- isotopes: ${}^1_1\text{H}$, ${}^2_1\text{H}$, ${}^3_1\text{H}$

Protium, Deuterium, Tritium

Carbon has 3 isotopes:



Section-II

Q no 6 (a)

Given data:

Apple: Berry: Cherry: Date

$3x$: $6x$: $2x$: $5x$

→ Apple candies exceeds date candies by 35.

To find:

Number of Berry candies

Solution:

Apple: Berry: Cherry: Date

$3x$: $6x$: $2x$: $5x$

Suppose the equation and their sum will be

DAY: _____

DATE: _____

$$3x + 6x + 2x + 5x = 16x$$

If Apple candies exceed
date candies by 35

So,

$$3x - 5x = 35$$

$$-2x = 35$$

$$x = -17.5$$

it cannot be negative

So date must exceed Apple

$$5x - 3x = 35$$

$$x = 17.5$$

In order to find number
of berry candies try
both values

Berry candies = $6x$	Berry = $6x$
Berry = $6x(17.5)$	$= 6(-17.5)$
	$= -105$

Berry candies
will be 105.

Answer:

There are 105
Berry candies.

DAY: _____

DATE: _____

Q no 6 (b)

Given data:

price of camera = 200 \$

discount / off = 25%

Tax = 6%

To find:

Total amount paid

Formula:

Total amount paid = Price - discount + Tax

Solution:

price = 200 \$

Discount = 25% of 200

$$= \frac{25}{100} \times 200 = 50$$

Tax = 6% of 200

$$= \frac{6}{100} \times 200 = 12$$

Amount paid = price - off + Tax

$$= 200 - 50 + 12$$

$$= 200 - 36$$

$$= 162 \$$$

Answer: Total Amount

paid will be 162 \$.

Q no 6 (c)

Given data:

$$\text{distance} = 36 \text{ km}$$

$$\text{speed} = 18 \text{ km/hr}$$

$$\text{Starting time} = 1 \text{ pm}$$

To find:

Time when bicycle reach destination.

Formula:

$$S = vt$$

$$\text{distance} = \text{speed} \times \text{Time}$$

Solution:

$$S = vt$$

$$36 = 18 \times t$$

$$\frac{36}{18} = t$$

$$t = 2 \text{ hrs}$$

when it start at 1 pm after 2 hours it will reach destination and time will be 3 pm

Answer:

Bicycle will reach at 3 pm.

Q no 6 (d)

Unscramble these math terms:

(i)

STSTALCITS

Answer: STATISTICS

(ii)

LGEBMAR

Ans: GRAMBLE

Q no 7 (a)

Give data:

diameter = 14 cm

$$\pi = \frac{22}{7}$$

To find:

Volume of sphere

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

Solution:

$$\therefore V = \frac{4}{3} \pi r^3 \quad r = \frac{d}{2} = \frac{14}{2} = 7 \text{ cm}$$

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

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

Answer: volume of sphere is 1437.33 cm^3

Q not

Given data:

Total saving = 25,000 Rs

Ratio: 1:2:3:4:5

To find:

Smallest share

Solution:

Ratio = 1:2:3:4:5

Sum of ratios = $1+2+3+4+5 = 15$ Share of 1st friend = $\frac{1}{15} \times 25,000$ $= 1666.67 \text{ Rs}$ Share of 2nd friend = $\frac{2}{15} \times 25,000$ $= 3333.3 \text{ Rs}$ Share 3rd friend = $\frac{3}{15} \times 25,000$ $= 5,000 \text{ Rs}$ Share of 4th friend = $\frac{4}{15} \times 25,000$ $= 6,666.67 \text{ Rs}$ Share of 5th friend = $\frac{5}{15} \times 25,000$ $= 8333.3 \text{ Rs}$ **Answer:** Smallest share is of
1st friend and it is

1666.67 Rs.

Q no 7 (c)

Spot the error / complete series.

i)

2, 6, 18, 54, 162, 486

(which no does not fit)

(Ans)

2, 6, 18, 54, 162, 486

Checking the ratio between terms

$$6 \div 2 = 3$$

$$18 \div 6 = 3$$

$$54 \div 18 = 3$$

$$162 \div 54 = 3$$

$$486 \div 162 = 3$$

Pattern = Each number is multiplied by 3

Sequence will be

$$2 \times 3 = 6$$

$$6 \times 3 = 18$$

$$18 \times 3 = 54$$

$$54 \times 3 = 162$$

$$162 \times 3 = 486$$

Conclusion: All numbers fit the pattern of multiplication by 3.

Ans: no number is misfit in series.

DAY: _____

DATE: _____

3, 5, 7, 11, 13, ⁱⁱ⁾

Ans

Series is 3, 5, 7, 11, 13,

Pattern: This series is a pattern or series of consecutive prime numbers.

So, next prime no is

Series will be 17.

Answer:

3, 5, 7, 11, 13, 17

Q no 7 (d)

Given data:

A triangle with
Sides 5cm, 12cm and 13cm.

To find:

All three angles of
triangle.

Formulae: 1-Pythagoras theorem

$$(\text{Hypotenous})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$$

$$2- \sin \theta = \frac{\text{Perpendicular}}{\text{Hypotenous}}$$

Solution:

Hypo
men
and
S

ce

DAY: _____

$$\cos \theta = \frac{\text{Base}}{\text{Hypotenuse}}$$

$$\tan \theta = \frac{\text{perpendicular}}{\text{Base}}$$

Solution:

In given sides

$$\text{Hypotenuse} = 13 \text{ cm}$$

remaining two are perpendicular
and Base.

$$\text{Suppose Base} = 5 \text{ cm}$$

$$\text{then Altitude} = 12 \text{ cm}$$

as

$$(\text{Hyp})^2 = (\text{Base})^2 + (\text{Altitude})^2$$

$$(13)^2 = (5)^2 + (12)^2$$

$$169 = 25 + 144$$

$$169 = 169$$

it means values are correct

$$\sin \theta = \frac{\text{perpendicular}}{\text{hypotenuse}}$$

$$\sin \theta = \frac{12}{13}$$

$$\theta = \sin^{-1} \frac{12}{13} = 67.3^\circ$$

$$\theta = 67.3^\circ$$

DAY: _____

DATE: _____

$$\cos \theta = \frac{\text{Base}}{\text{hypotenues}}$$

$$\cos \theta = \frac{5}{13}$$

$$\theta = \cos^{-1} \frac{5}{13} = 22.6^\circ$$

$$\text{Sum of 3 angles} = 180$$

$$67.3 + 22.6 + x = 180^\circ$$

$$180 - 67.3 - 22.6 = x$$

$$x = 90.1^\circ$$

3rd angle will be 90.1°

Answers:

$$\theta_1 = 67.3^\circ$$

$$\theta_2 = 22.6^\circ$$

$$\theta_3 = 90.1^\circ$$