

Section-1

QUESTION No. 3

(a) Why cells form organelles?

Cells form organelles to perform various internal functions. Organelles help cells to perform a wide range of tasks such as protein synthesis, generating energy,

Breaking down of waste materials.

By these process cell's ability improves to manage complex processes.

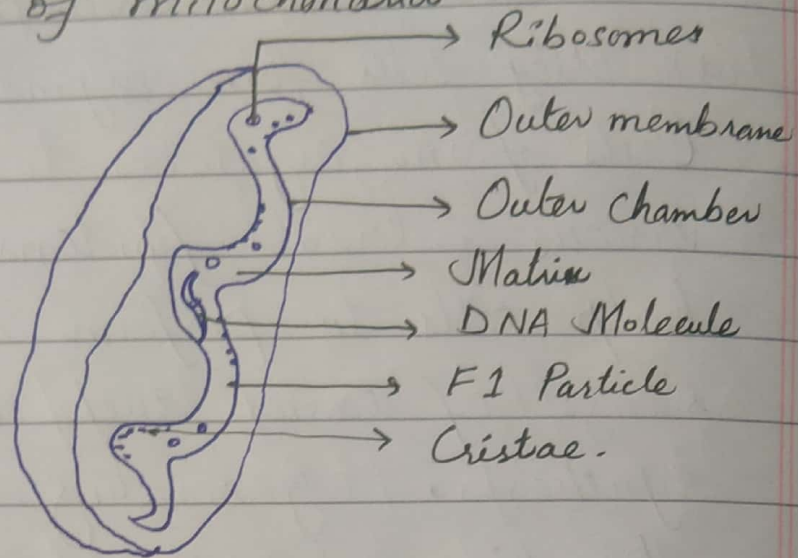
Mitochondria in human cell

Mitochondria is double membranous and self replicating cell organelle.

The process of cellular respiration occurs in mitochondria, which results in the formation of ATP (Adenosine Tri Phosphate). ATP is the energy currency of cell.

Mitochondria is called the power house of cell due to energy formation. The number of mitochondria varies from cell to cell.

Structure of mitochondria



Structure of mitochondria includes a double membrane system consisting of an outer and inner membrane.

The inner membrane is folded into Cristae which increase the surface area of cellular respiration, and the central region enclosed by the inner membrane is called the matrix.

(b) What is doping?

Doping is the process of adding small number of impurities into intrinsic semiconductor material.

By adding small amount of "dopant" atoms into pure semiconductors, their conductivity can

be increased. by orders of magnitude, making them suitable for creating electronic components like transistors and diodes.

Different types of Semi-Conductors

There are two types of Semi-conductors.

1. **Intrinsic Semi conductors**

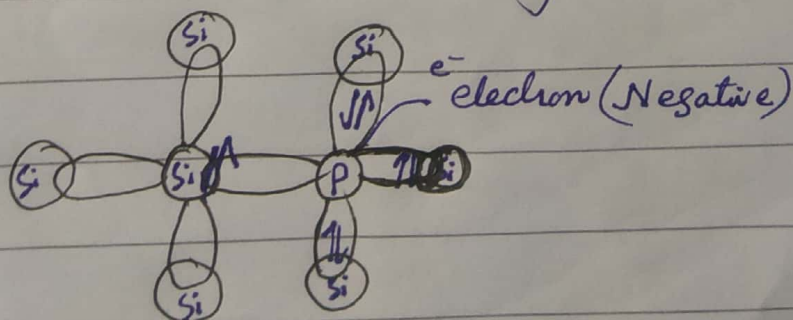
A semi conductor in its pure form is called intrinsic semi conductor.

2. **Extrinsic Semi conductors**

When impurity is added to a semi conductor, it becomes extrinsic semi conductor.

(i) **N-type extrinsic semi conductor**

When impurity is added to a pure semi conductor from fifth group of periodic table, N-type extrinsic semi conductor is formed.

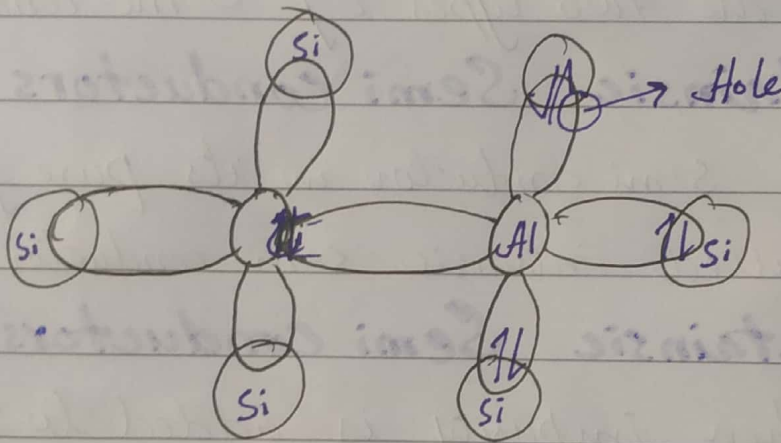


(ii) P-type extrinsic semiconductor

When impurity is added to a pure semiconductor from third group of periodic table. P-type extrinsic semiconductor is formed.

Take Al from - III group

Si from IV group



Hole: Hole is just a deficiency of electron brings positive charge.

Hole behaves like a proton, as proton is positive so hole is positive.

(c) Merits of volcanic eruption:

- (i) With volcanic eruption high heat of flow close to the Earth surface. This geothermal heat can be harnessed to produce / generate clean and renewable electricity.
- (ii) Volcanic ash and lava weather over time to create extremely fertile soil, which is rich in minerals and beneficial for plant growth.
- (iii) Volcanic eruption bring valuable minerals ^{and materials} to the Earth surface. These includes metals like copper, gold, silver etc..

Demerits of volcanic eruption:

- (i) The most destructive impact is the threat to human life. Lava flows, and hot gases currents, and volcanic bombs can kill people and destroy entire towns.
- (ii) Heavy ashfall can initially smother crops and render agricultural land unusable for long time.
- (iii) Volcanic eruptions release large

quantities of ash and toxic gases which can lead to various health problems like respiratory illness and skin disease.

(iv) Volcanic eruptions can destroy infrastructure, business, and farmland. It can effect on local and regional economies.

(d) Dengue

Dengue fever is a viral illness spread through mosquito bites.

Symptoms

High fever, headache, muscle and joint pain, nausea, vomiting, and rash.

Causes

Dengue is caused by a virus transmitted through the bite of infected Aedes mosquitoes.

Mosquitoes become infected by biting someone who already has

dengue.

Remedies

Supportive care with rest, fluid, and acetaminophen (paracetamol) for pain relief.

Question No. 5

(a) Causes of population explosion in Pakistan:

There are many causes of population explosion in Pakistan:

(i) **High birth rate and low death rate:**

Pakistan's birth rate is very high (around 27.7 per 1000 people) and low death rate (around 7.2 per 1000 people) creates a significant population growth imbalance.

(ii) **Poverty and illiteracy:**

Poverty often leads to the view that more children means more potential earners. Low literacy rates result in lack of awareness

about family planning.

(iii) Early Marriage:

Girls marrying young extend their productive years, leading to more children over their lifetime.

Control measures for population explosion in Pakistan:

(i) Family Planning:

Increase awareness through educational campaigns to dispel myths and provide a variety of options.

(ii) Contraceptive access:

Expand access to a wide range of contraceptive methods, especially in rural and marginalized areas.

(iii) Educate women and girls:

Promote education, particularly for women, as higher levels of education are linked to lower fertility rates.

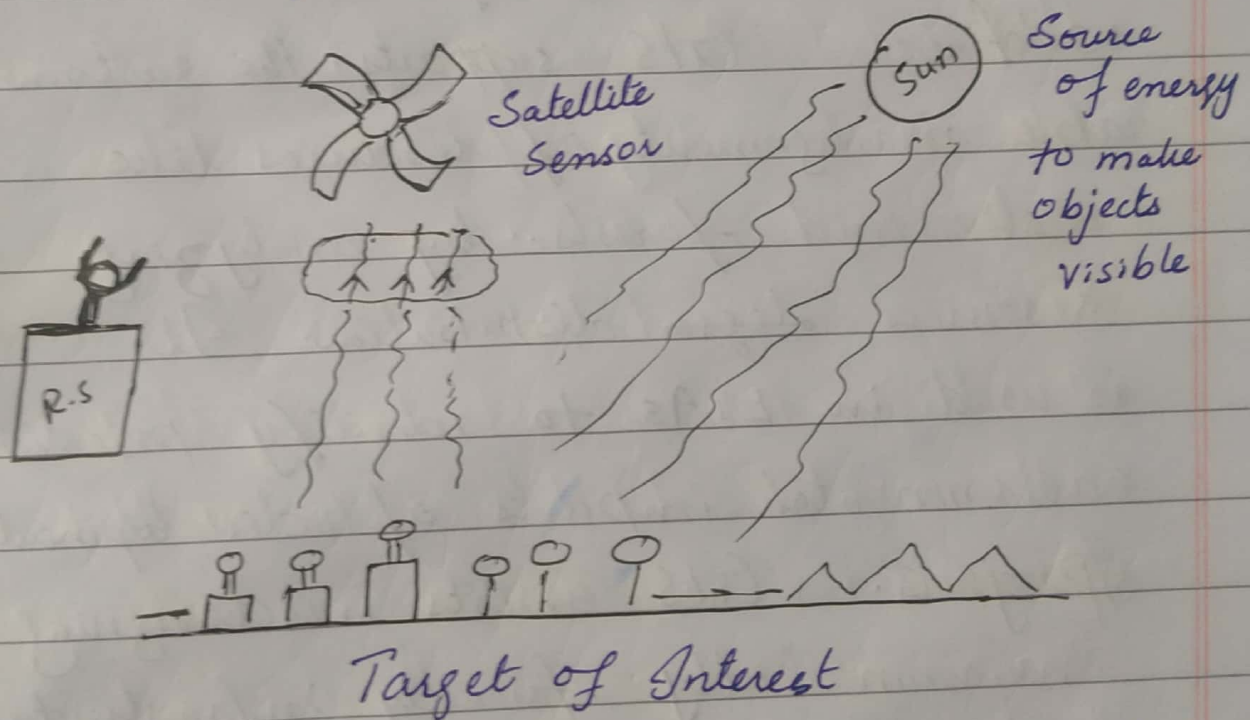
(iv) Enforce minimum marriage age:

Enforce a minimum marriage age of 18 and mandate pre-marital counselling.

(b) Remote Sensing

It is a science together information related to any geographic area or location by using the sensors.

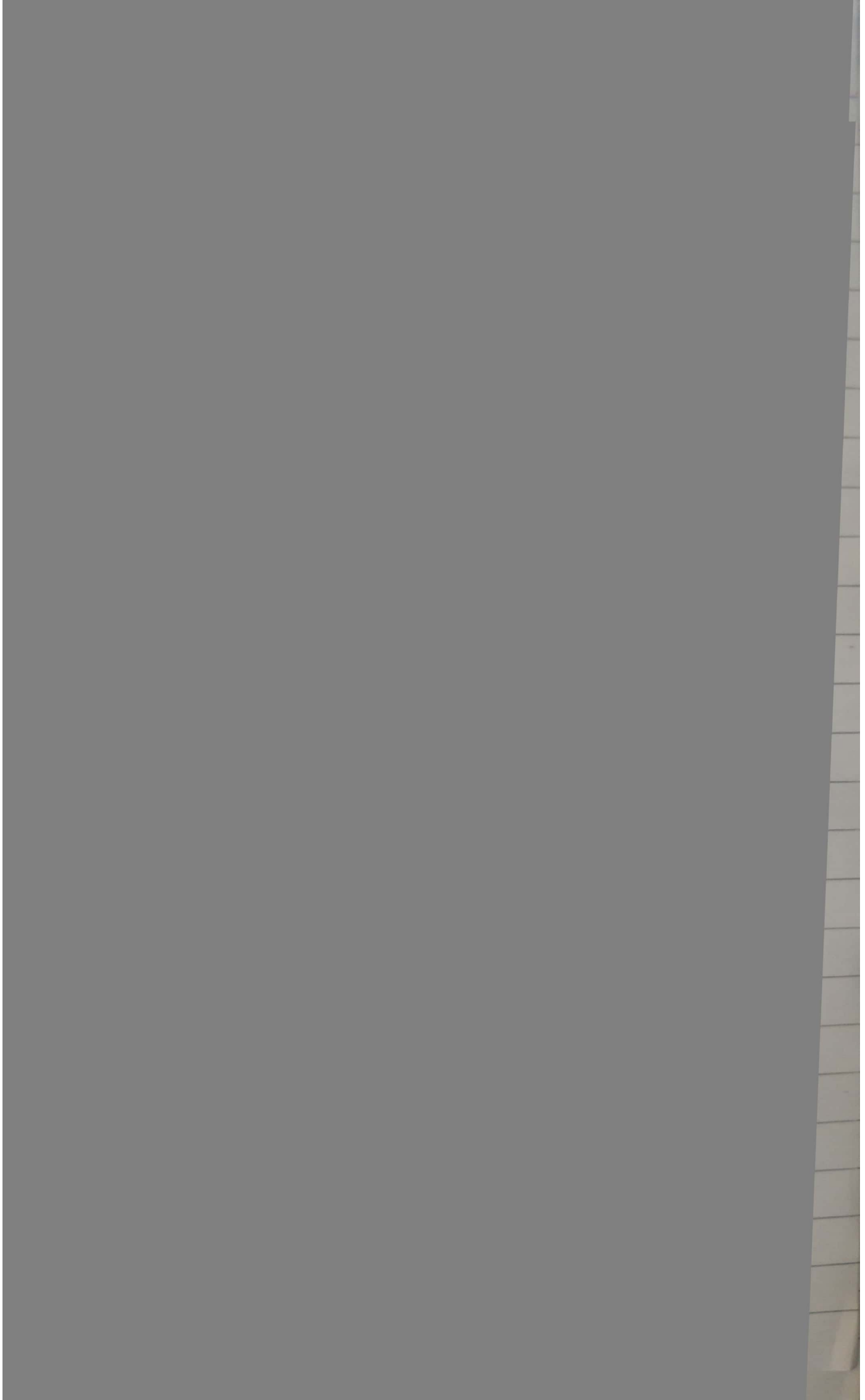
Process of remote sensing



1. Source of energy: Helps to make objects visible.
2. Interaction of radiation with atmosphere.
3. Interaction of radiation with target of interest.
4. Recording of reflected energy by sensors.

Role of GIS in environmental science:

GIS plays a vital role in environmental science. GIS is used to map and monitor environmental conditions like soil quality and water pollution. It helps assess risks from natural disasters such as floods and wildfires. GIS supports the sustainable management of resources like water and forests by analyzing resource degradation distribution. It is used in EIAs to identify potential environmental impacts of development projects. GIS assists in designing environmentally friendly infrastructure and planning for sustainable land use.



(d) Define the following terms:

Hydrometre:

It is a scientific instrument, which is made of a sealed glass bulb with a weighted bottom and a graduated stem. It is used to measure the relative density of a liquid.

Perimetre:

The total distance around the outer edge or boundary of a two-dimensional shape or area.

Eye wall and cyclone:

A large rotating storm system with organized thunderstorms that forms over warm oceans waters.

Deep focus:

A cinematic and photographic technique where ~~focus~~ objects in the fore ground, middle ground, and back ground of an image are all in sharp focus at the same time.

Light year:

A unit of distance used in astronomy equal to the distance light travels in

a vacuum in one Earth year.

One light year is approximately 5.88 trillion miles (9.5 trillion km).

Section-II

Question No. 6

(d)

(i) Statistics

(ii) Gramble

Question No. 7

(c)

(i) 2, 6, 18, 54, 162, 486, 1458

(ii) 3, 5, 7, 11, 13, 15