

General Science & Ability

Part- II

Section - I

Q2(a)

Star:

Star is a Celestial body that has gravitational effect and its own light. Nuclear reactions occur in stars to produce heat and light and their gravity causes surrounding interstitial objects to revolve around them.

Examples:

Sun, Proxima Centauri are good examples of star.

- Stars have their own light
- They have huge gravity.
- Planets revolve around star.
- They can become dead and turn into black hole with passage of time.

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Life cycle of Star:

Stars have a life cycle and their life cycle starts with a stage named as **Nebula** and with passage of time it expands and becomes yellow star, after this it further expands and grows to form white stars and when it collapses in its own gravity then forms a black hole.

Nebula → Yellow dwarf → white dwarf → Black hole.

Planet:

Planet is an interstitial object that revolves around stars like Sun and does not have its own light.

Example:

Earth, Mars and Jupiter are planets.

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Star

- 1 Stars have huge mass
- 2 They have huge gravity.
- 3 They have their own light and heat.
- 4 Planets revolve around star
- 5 Stars can turn into black hole
- 6 Life is not possible on stars

• Example:

Sun

7. Sun is centre of solar system

Planet

- planets' mass is less than stars' mass.
- Their gravity is less comparatively
- They does not have their own light and heat.
- Satellites revolve around planets
- Planets cannot turn into black hole.
- Life is possible and exist on planet earth.

• Example:

Earth,

Mars, Jupiter, Saturn etc.

- all planets revolve around sun in solar system.

Q no 2 (b)

1-Semiconductor:

A substance which have conductivity in between the conductors and insulator is called semiconductor. A semiconductor act as conductor at high-temperature and as insulator at very low temperature.

Examples:

Ge and Silicon are most common types of Semiconductor.

It types are

- Intrinsic Semiconductor (Pure)
- Extrinsic Semiconductor (Impure)

2-Difference between n-type and p-type semiconductors:

N-type

An extrinsic semiconductor formed by adding pentavalent impurity in

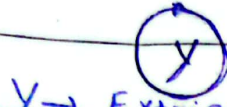
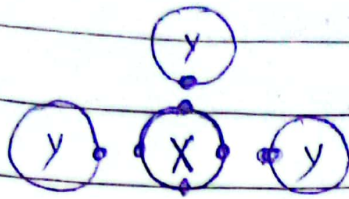
P-type

An extrinsic semiconductor formed by adding trivalent

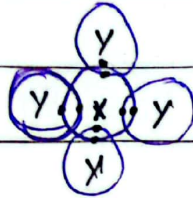
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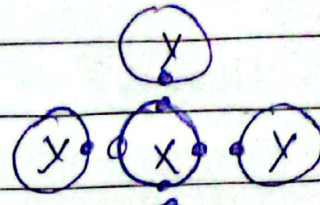
intrinsic semiconductor.

X $\rightarrow$ intrinsicY $\rightarrow$ Extrinsic

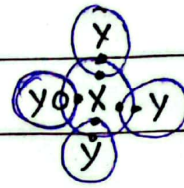
After overlapping



These free electrons as charge
conduct electricity carriers.

impurity in
intrinsic semiconductor

After overlapping



Here holes act
as charge
carriers.

3. Applications in modern life:

1- Semiconductors

are used in modern time
electronics like mobile phones,
computers etc.

2- They are used to design
chips which are useful
in production of many
military equipments also
and in the field of

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artificial intelligence.

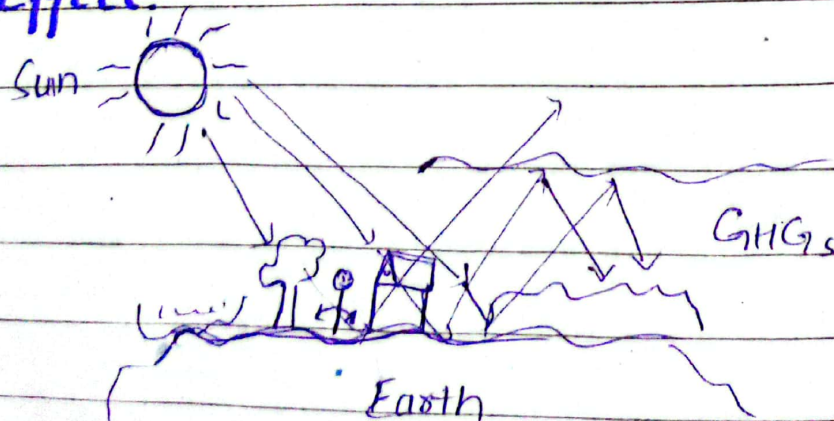
Q no 2 (C)

Global warming:

The continuous increase in temperature of Earth even above 1.5°C is called global warming. It is caused by various factors and its main cause is enhanced greenhouse effect because of enhanced emission of GHGs in the atmosphere.

The year 2024 was recorded as most hottest year because of global warming.

Mechanism of Greenhouse Effect:



Earth's surface has become hotter because of enhanced greenhouse effect. Sun's radiation comes on earth and Gtgs trap these radiation on the surface causing increase in earth's temperature. These gases are mostly released by man-made processes and things like from industries, vehicles etc. Gtgs are mainly emitted by burning of fossil fuel.

Three Major greenhouse gases:

1- CO_2 (Carbon dioxide):

CO_2 is major contributor of this effect as this traps sunlight. It is released by industries, vehicles, combustion of fossil fuels for energy purposes.

2. CH_4 (Methane):

Methane is

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released by burning processes
industries, volcanic eruption
etc. It also traps sunlight.

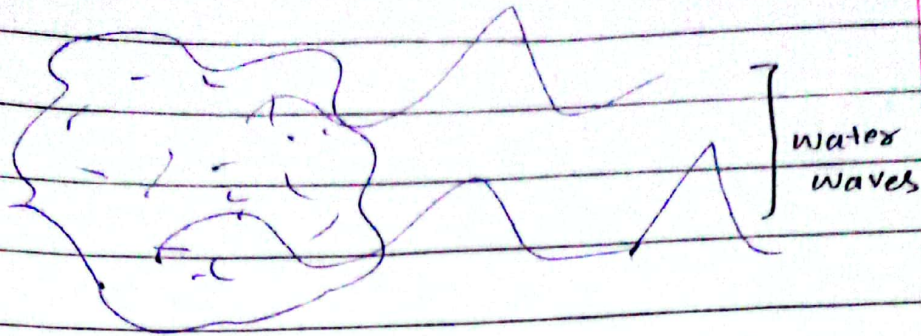
3. Sulphur dioxide (SO_2):

SO_2
is released by industries,
vehicles and many man-
made machines are cause
further increase in earth's
temperature.

Q No 9 (d)

Tsunami:-

A process or a
disaster that result when
sudden water waves which
are intense and high, hit
the coastal area near
the water body i.e near the
ocean or sea. The magnitude
and height of waves
vary with passage of
time and they cause
huge loss to life
and ecosystem.



Natural processes triggering tsunami:-

1- **Earthquake:** The movement of tectonic plate across oceanic crust can cause tsunami.

2- **Volcanic eruption:**

volcanic eruption also causes pressure imbalance and result in tsunami sometimes.

3. **Landsliding:**

landsliding can trigger tsunami. When sudden landsliding and huge mass fall in ocean it can trigger tsunami.

4. **Cyclones:** cyclones can also trigger tsunami.

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Potential impacts of Tsunami on Coastal areas:-

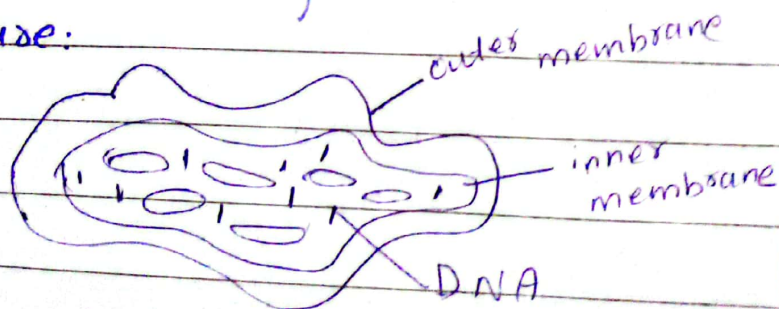
- 1- Life Loss
- 2- Property loss
- 3- Infrastructure loss
- 4- ecosystem destruction
- 5- Destruction of flora and
- 6- Flora
- 7- economic loss
- 8- water pollution
9. loss of coastal land.
10. loss of fertile land.

Qno3 (a)

Mitochondria:

Mitochondria is an organelle present in cytoplasm of animal cells which has double membranes and unique function.

Structure:



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Function:

1. ATP or energy is produced in it.
2. It increase immunity of cell.
3. It helps in balanced functioning of cell
4. It helps in protein formation

Mitochondria as "Powerhouse" of the cell:

Mitochondria is known as power house of cell because it produces the power, energy or ATP for cell. Its own DNA is present in it also.

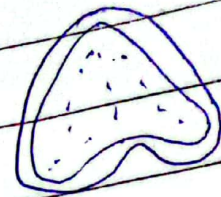
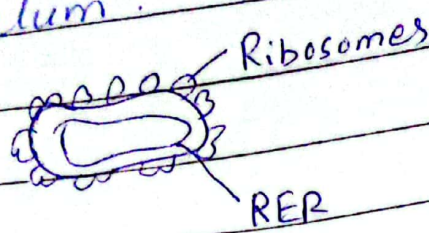
Ribosomes:-

Ribosomes are organelles present in cytoplasm in animals cells that perform its function to help in smooth working of cell. They may be

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present on Rough endoplasmic reticulum.



Ribosomal subunit

Function:

- 1- Main function of ribosomes is protein synthesis.
- 2- They help in immunity of cell.
- 3- They balance the coordination and control.

Q No 3 (b)

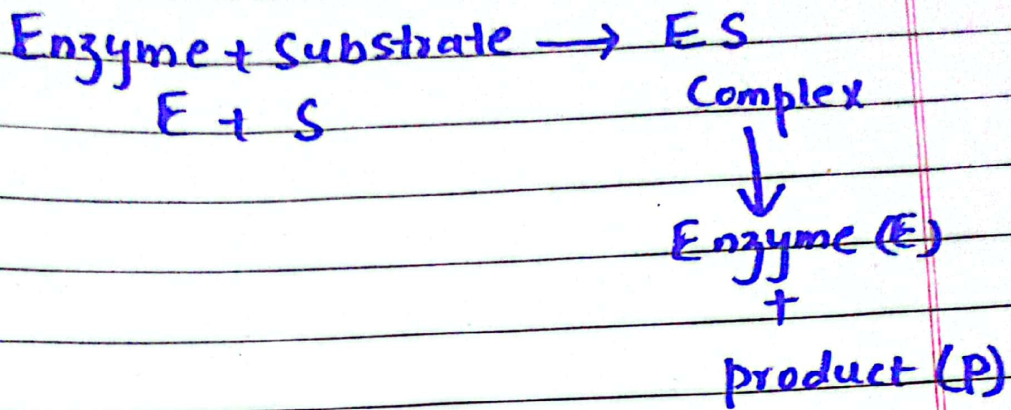
Enzymes:

Enzymes are basically proteins that perform different and specific biochemical reactions in living organisms. They react with substrate to form complex and then form the product quickly without being consumed.

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Enzymes speed up the reaction by lowering activation energy.

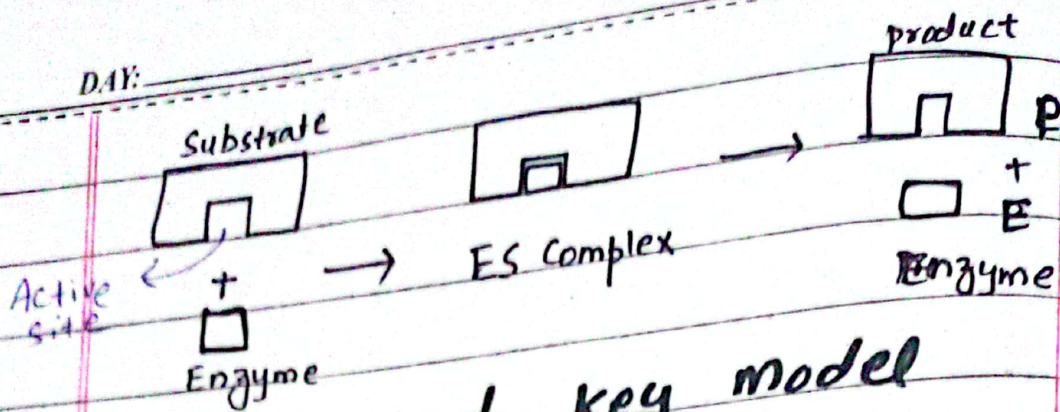


Lock and Key Model of Enzyme action:

Emil Fische

gave lock and key model to explain mechanism of enzyme action.

This says that enzyme fit in ^{active site of} substrate in same way as a key fit in a lock and then it forms product. It means there is a specific enzyme for each substrate.



Lock and key model Mechanism of Enzyme action.

Factors Affecting Enzyme Activity:

1- Temperature: Increase in temperature increase enzyme activity upto a certain limit called optimum temperature. Above which enzyme denaturation occurs.

2. pH:

Every enzyme work at a specific pH which is its optimum pH.

3. Concentration: Small enzyme can cause conversion of large mass of reactant to product. So concentration of substrate, when

increased, increase enzyme activity until a certain limit.

Q NO 3 (c)

Renewable Energy

1- The form of energy which can be renewed when it is used completely or depleted.

2- This energy is never depleted.

3- This is inexpensive.

4- It causes much less pollution comparatively.

5- Its installation cost is high.

Non-Renewable Energy

The form of energy which cannot be renewed when once it is depleted.

This can deplete with time.

This is expensive.

It cause pollution and global warming.

Its installation can be easy but its cost is high overall.

Carbon emissions
of this energy
is less

comparatively.

Future will
depend on
this energy.

Examples:

wind
energy, geothermal
energy, solar energy,
hydrothermal
energy, biomass.

It leaves
huge carbon
footprints.

Present day
man is still
dependent
on this.

Examples:

fossil
fuels: coal, oil,
natural gas

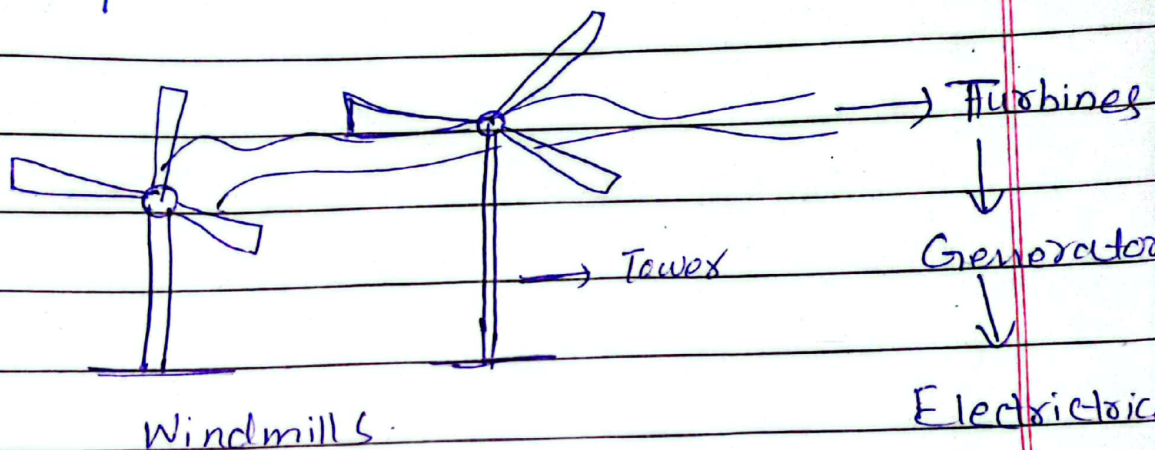
Potential of wind Energy as Sustainable source for the future.

Wind energy has
huge potential to be used
as sustainable source for
future. Windmills generate
huge amount of renewable
energy by using this

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natural source of wind.
 Its potential is to meet
 the demands as triple
 as of today's energy
 needs. So its future is
 bright and it needs to
 be explored and used.



Q no 3 (d)

Dengue fever:

Dengue fever is
 a viral disease that is
 transmitted when dengue
 mosquito bite human blood
 and transmit plasmodium
 in itself and then
 transfers the virus to
 another person. That vector
 grows in human blood

Vector responsible for this is mainly named as female Egyptian mosquito and it causes the symptoms of this fever.

Symptoms:

1. Headache
2. Nausea
3. Vomiting
4. Chest pain
5. Neck pain
6. Cold
7. Difficulty in breathing
8. Dizziness

Key preventive measures:

1. Destroy habitats of dengue mosquito.
2. Cover the water bodies in home.
3. Cover your body
4. Use lotions and mosquito spray.
5. Do not leave water in stored places and cover them.
6. Install vaccination

Q7 (a)

Given Data:

Total Number of people in Survey = 100 = T

People watch Cricket = 65 = C

People watch Hockey = 40 = H

people watch neither = 20 = n

To Find: x = People who watch both cricket and hockey. = ?**Formula =** $T - n = \text{people watching sports} = S$ $S = T - n$ ~~$S = 100 -$~~ $S = C + H - x$ x = people who watch both**Solution:**

$$S = T - n$$

$$S = 100 - 20 = 80$$

$$S = C + H - x$$

$$80 = 65 + 40 - x$$

$$80 = 105 - x$$

$$80 - 105 = -x$$

$$x = 25$$

Answer: 25 people watch both Cricket and Hockey.

Q 7(b)

Given data:

$$\text{length} = l \quad \text{width} = w$$

$$l = 4 + w \quad \text{Height} = 2.5 \text{ m}$$

$$\text{Perimeter} = P = 72 \text{ m}$$

To Find:

$$\text{Volume of rectangular pool} = l \times w \times h = V = ?$$

Formula:

$$V = l \times w \times h, \quad P = 2(l + w)$$

$$\text{Solution: } V = l \times w \times h$$

$$P = 2(l + w)$$

$$P = 2(4 + w + w)$$

$$P = 2(4 + 2w)$$

$$P = 8 + 4w$$

$$72 = 8 + 4w$$

$$w = 16 \text{ m}$$

$$l = w + 4 = 20 \text{ m}$$

$$V = l \times w \times h$$

$$V = 20 \times 16 \times 2.5$$

$$V = 800 \text{ m}^3$$

Answer: Volume of water needed to fill the rectangular pool is 800 m^3 .

Q 7 (d)**Given data:**

Age of father + son's age = 75 years
Ten years ago:
Father's age = 4 × son's age

To find:

current ages of father
and son.

Formula:

Father's current age = x

Son's current age = y

$$x + y = 75 \quad \text{--- (1)}$$

10 years ago

$$x - 10 = (y - 10) \times 4 \quad \text{--- (2)}$$

To find:

$$x = ?$$

$$y = ?$$

Solution:

$$x + y = 75 \quad \text{--- (1)}$$

$$x - 10 = 4(y - 10) \quad \text{--- (2)}$$

$$x - 10 = 4y - 40$$

From eq (1) $x = 75 - y$ Put in (2)

$$75 - y - 10 = 4y - 40$$

$$75 - 10 + 40 = 4y + y$$

$$105 = 5y \Rightarrow y = 21$$

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put $y = 21$ in eq ①
 $y + x = 75$
 $21 + x = 75$
 $x = 54$

Answer =

Father's current age = 54

Son's current age = 21

Q 8 (a)

Given Data:

ROAD = UQDG

To Find:

LAKE = ?

Rule of coding = ?

Solution:

$R \Rightarrow U \rightarrow 3$ steps forward

$O \Rightarrow Q \rightarrow 2$ steps forward

$A \Rightarrow D \rightarrow 3$ steps forward

$D \Rightarrow G \rightarrow 3$ steps forward

Code:

1st letter will come after
3 steps forward in alphabets.

2nd letter by 2 steps forward.

3rd letter by 3 steps forward.

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4th letter by 3 steps forward
So for Lake the code
will be as:

L = O

A = C

K = N

E = H

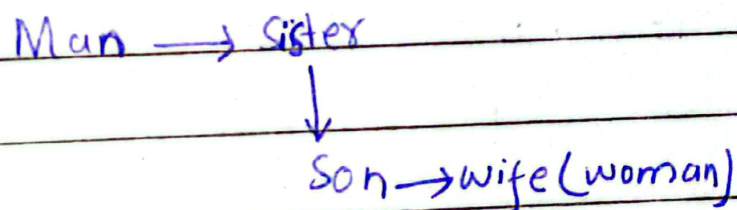
Answer:

LAKE = OCNH

Q 8 (b)

Solution:

A man tells a woman,
"The son of my sister's husband
is father of your son." How
is woman related to the man.



Answer:

The woman is wife
of man's nephew.

Q8 (c)

(i)

4, 12, 6, 18, 9, 27, —

Sequence: Multiply term by 3, then divide next term by 2 and follow this sequence.

4, 12, 6, 18, 9, 27, 13.5
 $\times 3 \quad \div 2 \quad \times 3 \quad \div 2 \quad \times 3 \quad \div 2$

Answer: Next number in the series will be 13.5.

(ii)

1, 2, 6, 24, 120, —

Sequence:

There is sequence of multiplication first by 2, then by 3, then by 4, then by 5, next term will come by multiplying 120 with 6 so it will be 720.

1, 2, 6, 24, 120, 720
 $\times 2 \quad \times 3 \quad \times 4 \quad \times 5 \quad \times 6$

Answer:

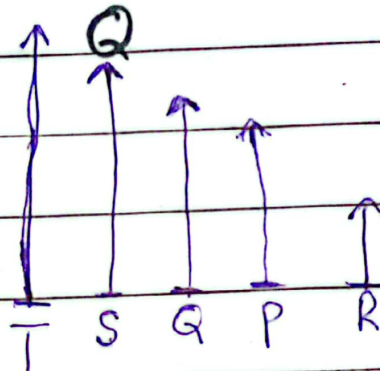
1, 2, 6, 24, 120, 720.

Q 8 (d)

- P is shorter than Q but taller than R



- S is shorter than T but taller than Q



Shortest = 150 cm = R

Tallest = 180 cm = T

Maximum possible range =

$$T - R = 180 - 150 = 30 \text{ cm}$$