



(SHORT QUESTIONS)



(i)

Write function...

(Ans)

ANTIDIURETIC HORMONE

Gland : Antidiuretic hormone is released by posterior pituitary gland.

Function : ADH helps in the reabsorption of water by making distal convoluted tubule and collecting tubules permeable to water.

ADH is secreted when there is low level of water in blood. As a result, the distal convoluted tubule and collecting tubules



are made permeable to water and it is absorbed back by the body. In this case, urine is concentrated and low in volume. ADH secretion stops when water level in body is high.

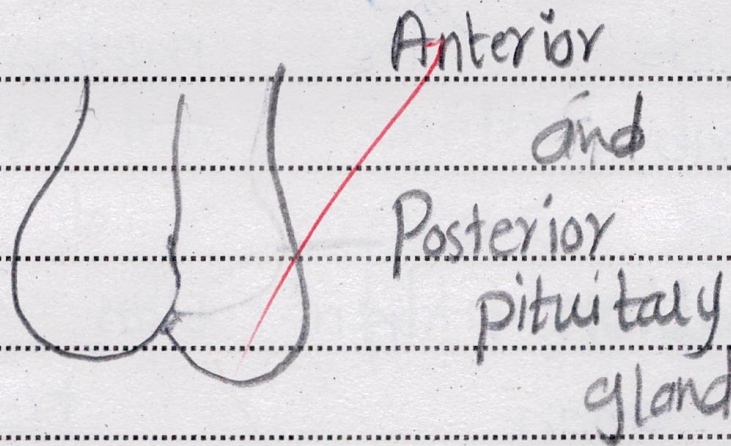
OXYTOCIN

Gland: Oxytocin is also secreted by posterior pituitary gland.

Function: Oxytocin helps in child birth by making strong uterine contractions. It also initiates let down reflex that helps in the



secretion of milk from
alveoli of mammary
glands.



(ii)

What ...

(Ans)

INVITROFERTILIZATION

Definition: In vitro fertilization is



the process where sperm
and egg are fertilized
outside the body, and
the zygote ^{embryo} is put
inside the mother's
womb.

Explanation : In this process,
a woman is treated
with hormones to release
many eggs at once.
The eggs are then
removed from the body
and put in a
glass dish with
suitable conditions. so
Similarly, sperm is taken
from male and then
it is made to



fertilize the egg. After
3-5 days, the fertilized
embryo is put inside
the mother's womb.

Advantage: This method is
used to overcome the
problem of infertility.

(Liii)

Why Mendel...

(Ans)

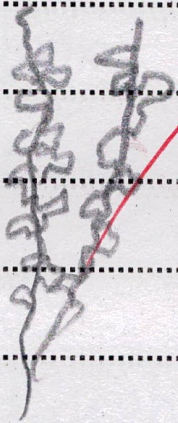
SELECTION OF PEA PLANT



- **Easy to Grow:** Pea plant is easy to grow in pots and open ground.
- **Short Life Cycle:** Pea plant has a short life cycle.
- **Cross Fertilization:** Pea plant is capable of cross fertilization.
- **Self Fertilization:** Pea plant is also capable of self fertilization.
- **Distinct Traits:** Pea plant has sharp distinct traits that clearly differ from each other.



Seven Traits : Mendel compared
seven contrasting traits
in his experiments (such
as seed shape etc)



Pea plant

(v)

Define...

(Ans)

TRANSCRIPTION

Definition : It is a process

(iv)

4. Define

(Ans)

SEMI-CONSERVATIVE MODEL

Introduction : Semi-conservative model is a proposed DNA replication model, where the parent DNA strands are partially conserved in the daughter DNA.

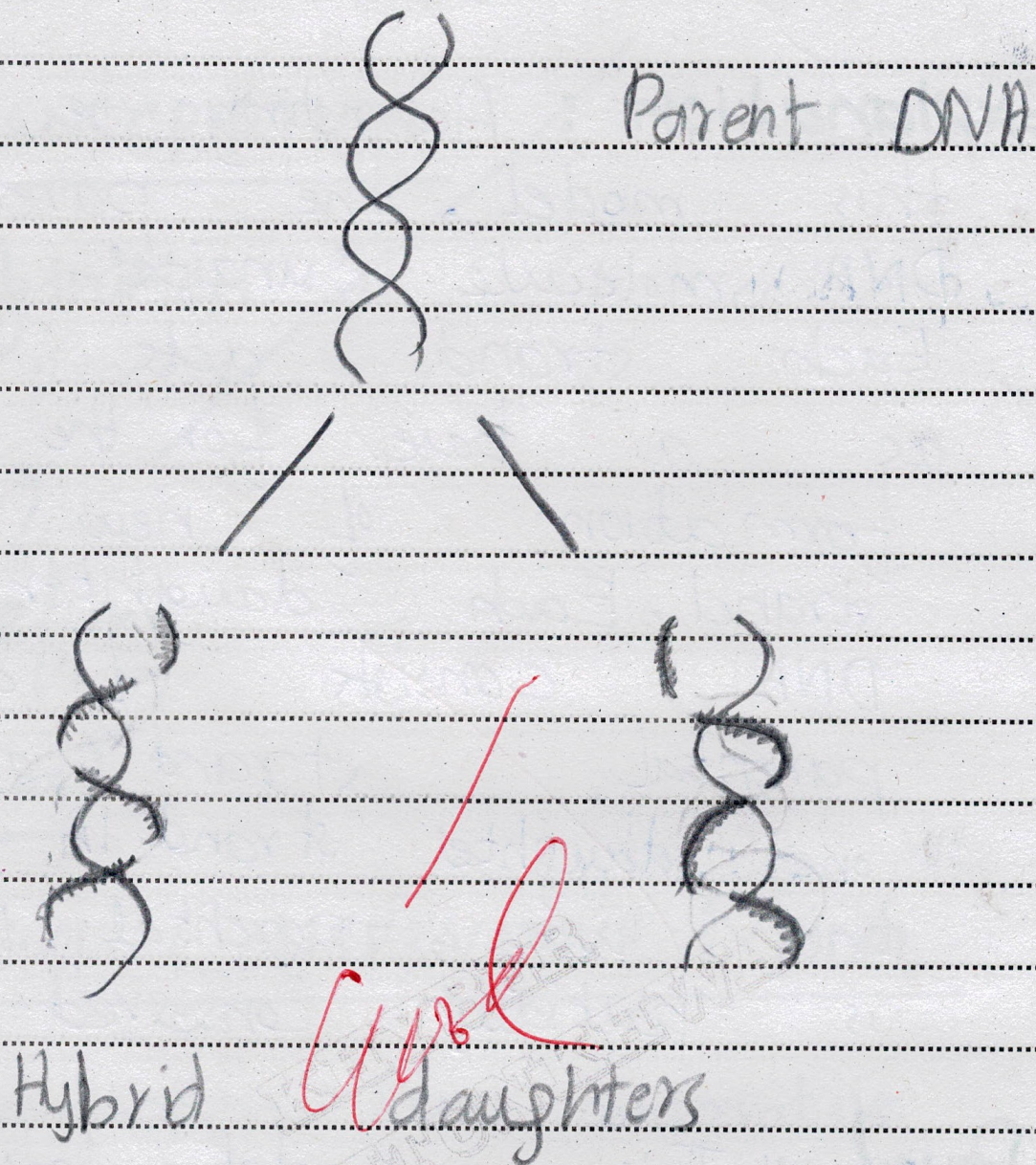


Explanation : According to this model, the parent DNA molecule 'unzips'. Each strand acts as a base for the formation of new strand. Each daughter DNA consists of one parental strand and one daughter strand. In this way, parental DNA is partially conserved.

Proof : This model has been proved by Meselson - Stahl experiment.

Diagram:

(Next page)



5. (vii) How . . .

(Ans)



DEFORESTATION

Definition: Deforestation is the process of cutting down of trees.

EFFECTS

- **Less Rainfall:** Deforestation in an area leads to less rainfall.
- **Destruction of Habitats:** Cutting the trees destroys the habitat of many animals.
- **Soil Erosion:** Deforestation leads to soil erosion when floods hit an



area.

→ ~~1%~~ High Pollution: Trees purify the air by taking CO_2 and releasing O_2 . Their destruction leads to pollution of the environment.

→ High Temperature: Areas that have more forests have moderate temperatures. Conversely, deforestation leads to increase in temperature.



(xii)

6 Differentiate . . .

(Ans)

RESTING MEMBRANE POTENTIAL

→ It is the potential across the neuron membrane when it is not conducting an impulse.

→ The potential inside the neuron is negative as compared to outside.

ACTIVE MEMBRANE POTENTIAL

→ It is the potential across the neuron when it is conducting an impulse.

The potential inside the membrane is positive as compared to outside.



→ Voltage regulated
 Na^+ gates are closed

Voltage regulated
 Na^+ gates are open.

→ K^+ gates are open.

The K^+ gates are closed

7.

(x)

Justify ...

(Ans)



SKIN AS A THERMOREGULATORY ORGAN

→ Vasodilation :-

Vasodilation refers to the widening of blood vessels. When body temperature is high, skin arterioles dilate. As a result more blood flows to the skin and more heat is lost.

→ Vaso constriction :-

Vasoconstriction is the narrowing of blood vessels. When body temperature is low, arterioles supplying blood to the skin become narrow.

As a result, less heat is lost through skin.

→

Sweating :-

In high body temperature scenarios, heat is also lost from the skin during sweating.

→

Goose bumps :-

During goosebumps, the hairs on our skin get erect. This forms an insulating layer that traps heat.

Normal vessel

Vasodilation

Vasoconstriction



(ix)

3. Define...

(Ans)

Ribs

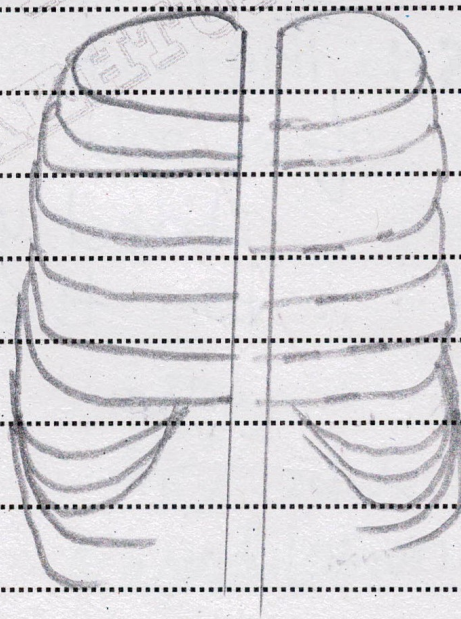
Definition: Ribs are 12 pairs of bones in the thoracic cavity that protect the lungs and the heart.

True Ribs: The first 7 pair of ribs that are directly attached to the sternum are called true ribs.



→ **False Ribs** :- The next three pairs (8-10) are attached to the sternum via the costal arch. These are called false ribs.

→ **Floating Ribs** :- The last two pairs (11-12) are not attached to the sternum. They are called floating ribs.





(xiii)

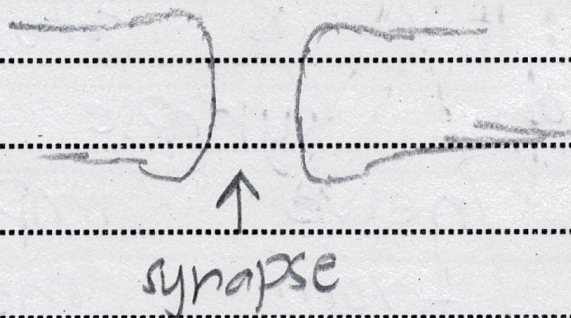
9.

Define

(Ans)SYNAPSE

Definition : Synapse is the junction where the nerve impulse is conducted from one neuron to another that are not cytoplasmically connected.

Diagram:





ELECTRICAL SYNAPSE

Mechanism : It is the type of synapse characterized for rapid signal transmission where the action potential of the pre-synaptic neuron is able to depolarize the post-synaptic neuron.

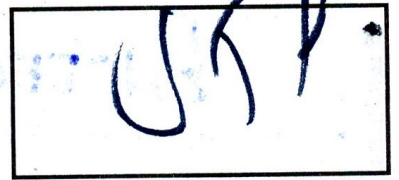
Distance : The synaptic cleft is of about 0.2 nm

CHEMICAL SYNAPSE

Mechanism : It is the type of synapse where nerve impulse travels from one neuron to another.



Fic. No.



(صرف بورڈ کے استعمال کیلئے) امیدوار یہاں کچھ نہ لکھیں

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neuron via chemical
messengers called
neurotransmitters.

Distance : The synaptic cleft
is of about more
than 20nm.

(viii)

Define . . .

(Ans)



BIOTECHNOLOGY

Definition : Biotechnology is the branch of biology which deals with the usage of organisms for the betterment of humans.

Importance : Biotechnology is a very important branch of biology. It has helped human life in many ways.

EXAMPLES

→ **Cloning :** Cloning of organisms has proved to be very helpful. For example, high quality and good product yielding crops can be cloned in order to



get of a new generation
of high quality crops.

→ **Insulin Production** : Insulin deficiency in patients can be cured through biotechnology.

→ **Recombinant DNA** : A gene of desired quality / trait can be inserted in an organism through recombinant DNA technology.

(LONG QUESTIONS)



Q.5.

1.

Write . . .

Ans.

AXIAL SKELETON

Definition : Skeleton located in mid-body is called axial skeleton.

Parts : Axial skeleton is composed of :-

- Skull
- Ear Bones
- Neck bone
- Vertebrae
- Ribs



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SKULL

The skull
consists of :

Cranial Bones (8) :-

- Frontal
- Occipital
- Sphenoid
- Ethmoid
- Temporal (2)
- Parietal (2)

Face Bones (14) :-

- Lacrimal (2) :- They are
the cheek bones



- Zygomatic (2) :- Present in the medial or wall of the orbit.
- Nasal (2) : Two slender bones at the bridge of nose.
- Internal nasal conchae (2) : They are present in face also.
- Palatine (2) : It is also present in face, *internal to maxilla*.
- Maxilla (2) :- It is also part of facial bones. It makes the upper jaw.
- Vomer : There is only one vomer bone.
- Mandible :- It is the lower jaw bone.



EAR BONES

of

6

Ear consists
bones :-

- Malleus (2)
- Incus (2)
- Stapes (2)

NECK BONE

Neck contains
one U-shaped bone :- The
hyoid.

VERTEBRAL COLUMN

Vertebral
column consists
(33) bones :- after fusion?

→ Cervical (7) :- Present in
cervical region.

→ Thoracic (12) :- Present in
thoracic region.



- Lumbar (5) :- Present in lower back.
- Sacral (5) :- Present in sacral region.
- Coccyx :- It consists of 4 fused bones.

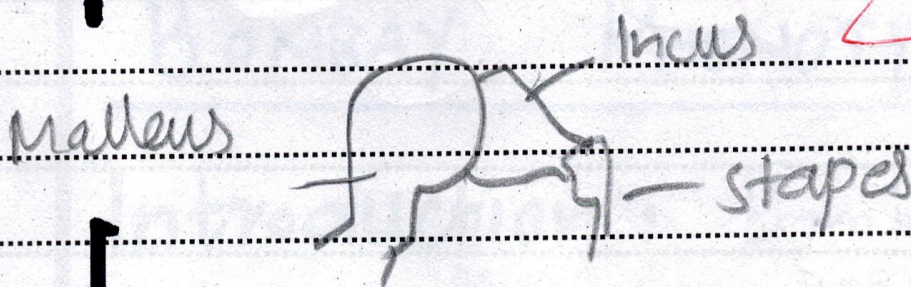
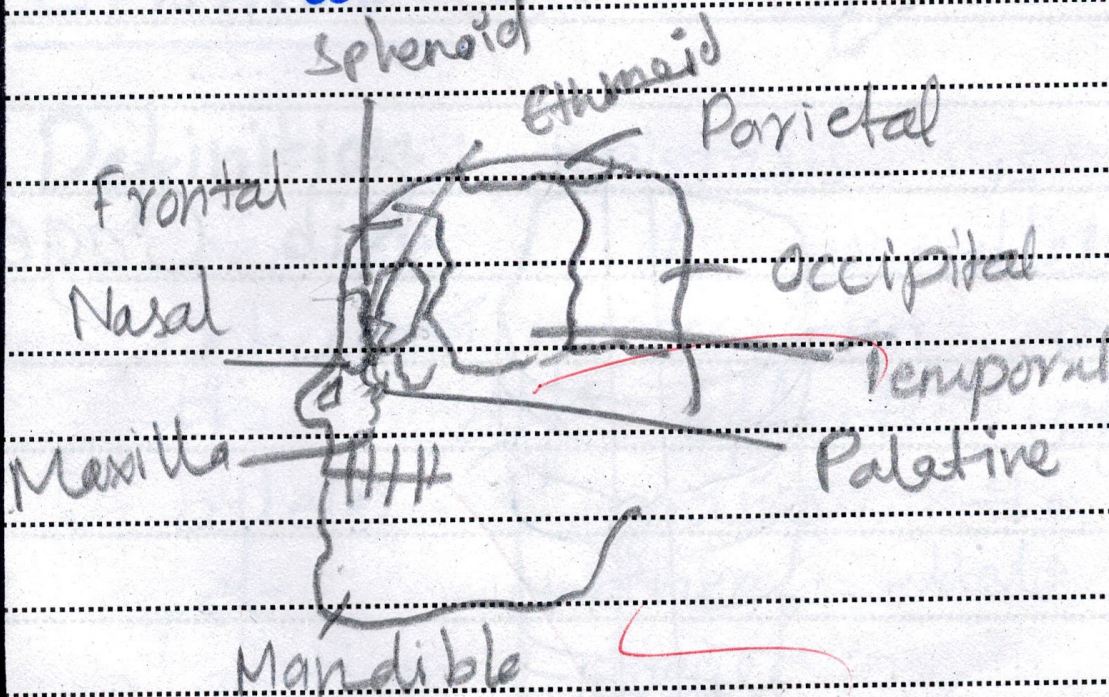
RIBS

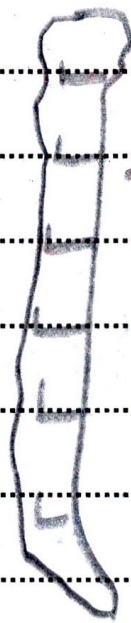
There are 12 pairs of ribs that protect the lungs and the heart.

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False Ribs :- The next three pairs are attached to the sternum via the costal arch.

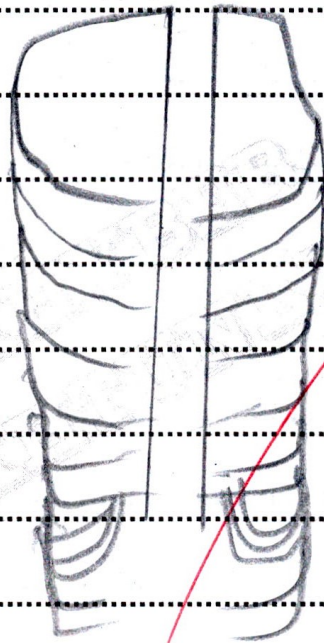
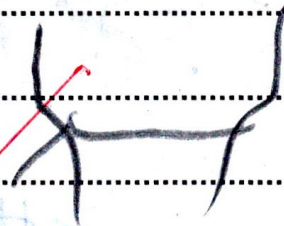
Not Floating Ribs:: The following two pairs are not attached to the sternum.





— Vertebral
column

Hyoid



Rib Cage



Q.4. (a)

2. Bombay ...

(Ans)

3rd = 7

3

EPISTASIS

Definition: Epistasis is an example of non-allelic inheritance interaction where the effect of one allele masks the effect of another allele at another locus.

BOMBAY PHENOTYPE

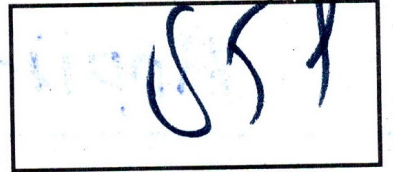
Introduction: Bombay phenotype is an example of epistasis in humans. In this case, a human may be genotypically A, B or AB, but phenotypically is O.



Discovery : It was discovered in Bombay (Mumbai).

Discovery?

Explanation: The effect of ABO blood group system can be masked by 'H' gene present on chromosome 19. Usually, humans with allele $I^A, I^B, I^A I^B$ are A-type, B-type, AB-type and O type respectively. However, there are only antigens formed if H gene is present. For example, B enzyme is released by I^B which converts H substance into b antigen. However, if H substance is not present, the organism will be phenotypically O.



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Q.4.b.

Write...

Ans.

APPLICATIONS OF PCR

PCR : It stands for
Polymerase Chain Reaction.

Components :

- dNTPs
- Taq polymerase enzyme
- Primer
- PCR machine.



Applications

- **Desired Gene**: PCR is used to produce desired gene by making millions of copies.
- **Short Time**: The processes of PCR take short time.
- **Crime Investigation**: PCR techniques can be used to match fingerprints in crime investigation.
- **Gene Therapy**: PCR is used in gene therapy.
- **Detection of Micro-organisms**: PCR is used for detection of micro-organisms.



- **Genome Analysis**: PCR is used in genome analysis.
- **Genetic Engineering**: PCR is used in genetic engineering.

Q.6. (a)

INSIGHT LEARNING

Use of Reason

- A type of learning that uses reason to learn new things.

Use of Logic

- The animal uses actual logic.

Rapid Learning

- In this type, an animal rapidly learns a behaviour.

No Experience

- No experience is involved

Intelligence

- It is related to organism's intelligence

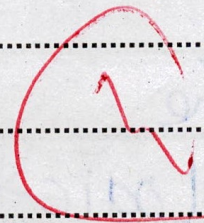


Example :

↳ Chimpanzee uses insight learning to adapt to certain situations.

Experiment : Kohler placed a banana out of the reach of a chimpanzee. It used insight learning to get that food.

Q.6. b.

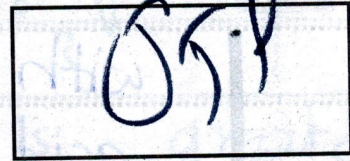


TRANSPORT OF CO₂

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CONTINUATION SHEET

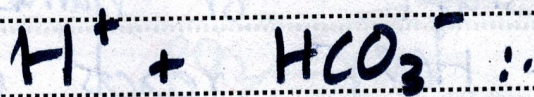
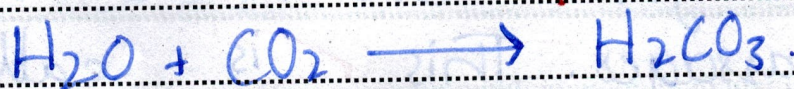
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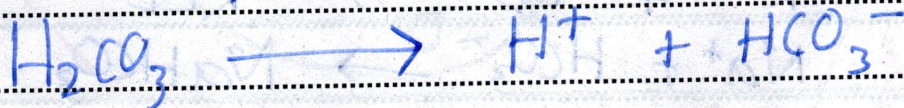
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Formation of H_2CO_3 :-

When CO_2 enters a red blood cell, it reacts with H_2O to form carbonic acid.



H_2CO_3 is unstable and dissociates into H^+ and HCO_3^-



H^+ increases acidity.
However oxyhaemoglobin attaches

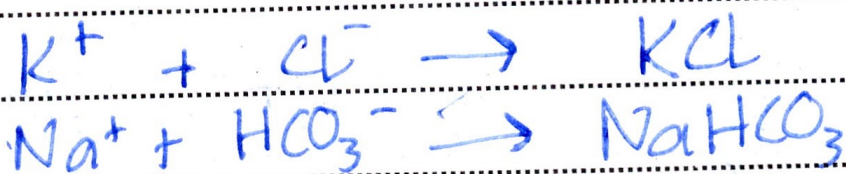


with it to form haemoglobin
acid and release O_2 .

Oxyhaemoglobin + hydrogen $\rightarrow$ Haemoglobinic acid
+ oxygen

Chloride Shifts :-

The HCO_3^- ions move out
and Cl^- ions move in
through bicarbonate-chloride
passages. This is called
chloride shift or hamburger
phenomena. HCO_3^- reacts with
 Na^+ and Cl^- ions
react with K^+ .

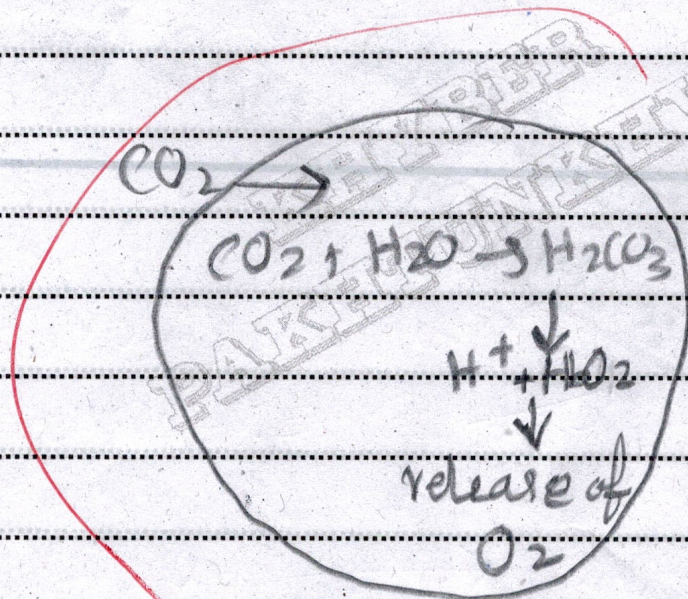




Transport :-

chloride shifts?

If CO_2 is greater in tissue cells, then the reaction proceeds as above. If CO_2 is greater in RBC, such as in lungs, H^+ and HCO_3^- react to form CO_2 and H_2O . CO_2 is released. L-C



(If CO_2 is higher in tissue cells)

the H⁺ is released on demand

