



SECTION-B

QUESTION-2

Attempt any 10 parts .

Part - 1

Write function of ADH and Oxytocin.

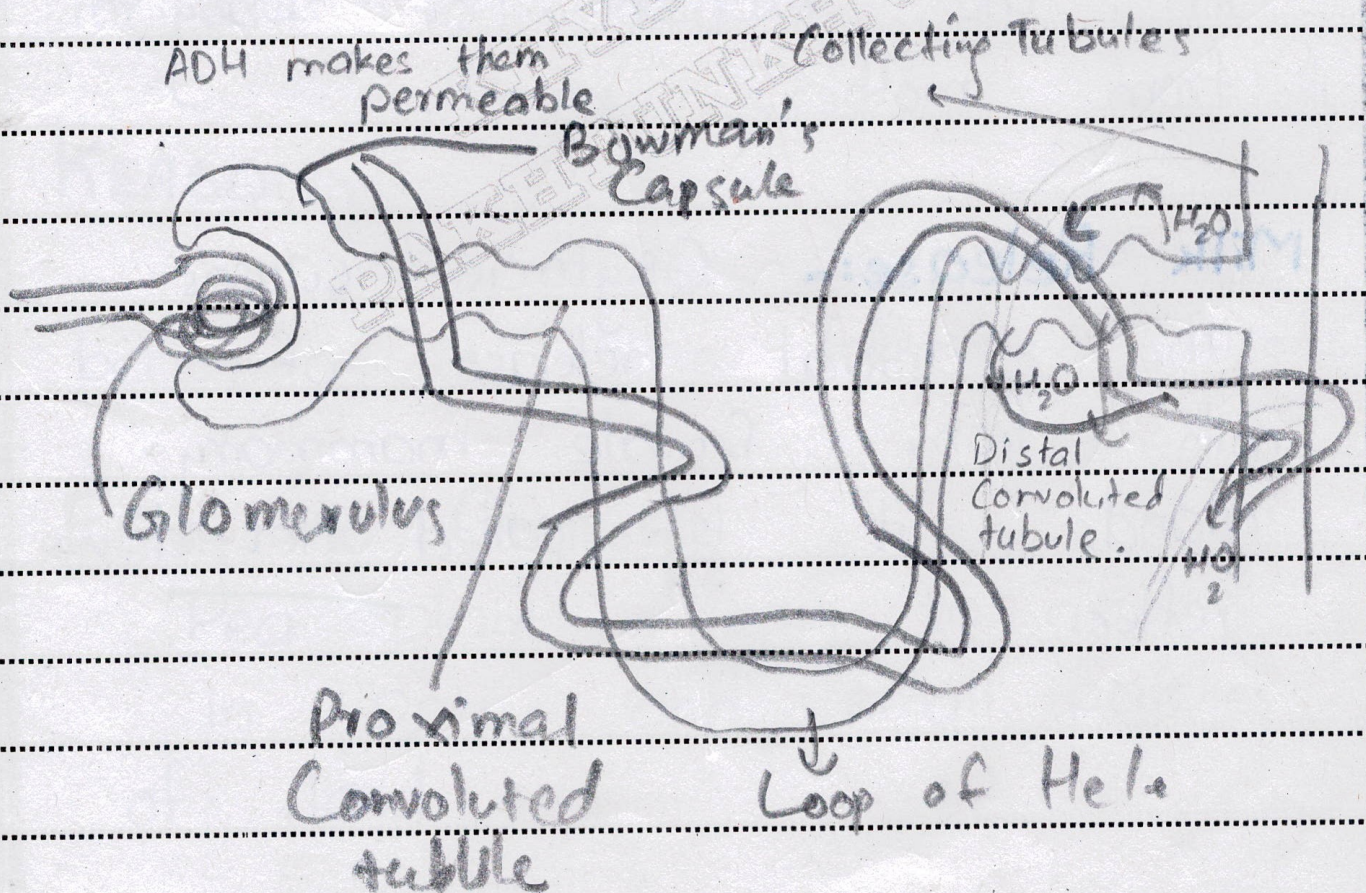
ANTIDIURETIC HORMONE;

INTRODUCTION;

Antidiuretic hormone is secreted by the posterior lobe of pituitary gland. It is released to control the level of water in the blood.

FUNCTION:

Water Retention:- When the water level in body is low, ADH is secreted and it acts on the distal convoluted tubule and collecting ducts of nephrons, making them more permeable to water. Thus water is reabsorbed and water level does not decrease.



OXYTOCIN:

INTRODUCTION:

This hormone is released by posterior pituitary.

FUNCTION:

Uterus Contraction:- Oxytocin causes contraction of uterus during child birth and helps in the expulsion of baby from mother's womb.

Milk Release:- Oxytocin causes the actual release of milk from female mammary glands, it is called let-down reflex.



Part-2

Why Mendel chose pea plant ?

MENDEL CHOSE PEA PLANT:

Mendel chose garden pea plant (Pisum sativum) for his experiments.

REASON:

He chose pea plant because of the following reasons.

Easy to Grow:

Pea plant is easy to grow in pots and small patches of land.



Short Generation Time;

Pea plant has a relatively short generation time.

Self-Pollination;

It can reproduce by self-pollination.

Cross-Pollination;

It can also reproduce by cross-pollination.

Distinct Characters;

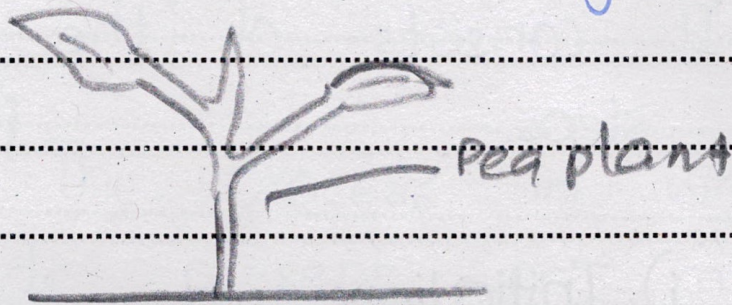
It possesses distinct heritable contrasting characteristics.

Characteristics;

It possesses seven distinguishable characters which are; flower colour, pod shape, pod colour,



seed shape, seed colour, flower position and stem height.



Part-3

Define transcription and ?

TRANSCRIPTION:

Definition:

The process in which the genetic code present on DNA for the synthesis of a protein is copied on to an RNA (called mRNA) is called transcription.



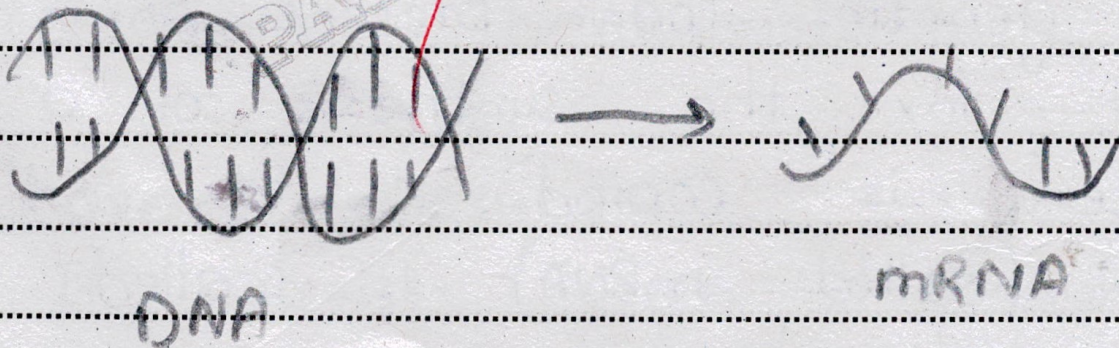
Steps:

It consists of the following steps.

- i) Initiation.
- ii) Extension.
- iii) Termination.

Significance:

It holds great significance as it converts the genetic code to a form that can be used to generate a protein.





TRANSLATION:

Definition:

The process in which the code present on mRNA is interpreted and a polypeptide is formed (which will later fold into an active protein) with the help of ribosomes is called translation.

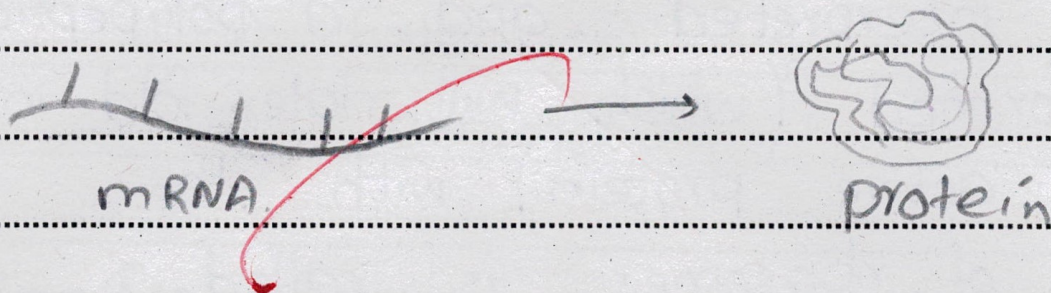
Steps:

It consists of the following steps.

- i) Activation of amino acids.
- ii) Formation of initiation complex.
- iii) Extension.
- iv) Termination.

Significance:

It is of great value as it forms a protein necessary for cellular functions.



Part-4

How is deforestation 2....?

EFFECT OF DEFORESTATION:

Deforestation has a great impact on environment. It exerts a harmful effect on environment.



Definition of Deforestation;

The unplanned removal and cutting of trees is called deforestation. Following are its effects on environment.

1) CO_2 Level;

Trees ~~remove~~ CO_2 from air through photosynthesis, thereby cleaning the atmosphere.

Due to deforestation, this process has slowed down significantly and CO_2 levels have risen.

2) Temperature Increase;

CO_2 ~~are~~ a greenhouse gas. Due to deforestation, its level has risen which affects the global average temperature.



3) Soil Erosion;

Trees help prevent soil erosion due to floods. Due to deforestation, the process of soil erosion has significantly increased.

4) O_2 Level;

Trees release oxygen gas into air. It is necessary for survival of organisms. Due to deforestation, the air has become polluted and oxygen levels have shifted from their normal values.

5) Loss of Habitat;

Trees are home to a wide variety of organisms. Due to deforestation, these organisms



have lost their habitat.

6) Barren Land;

Trees provide shade to soil and thus soil can maintain its moisture. Deforestation has caused the soil to lose its moisture and thus become barren.

Part - 5

Define true, false - - - - ?

TRUE RIBS;

DEFINITION;

Those ribs that



connect directly with sternum without any intermediary structure forming the connection between ribs and sternum.

On the dorsal side, they are connected with vertebral column and on ventral side, they are connected with sternum.

NUMBER:

There are 7 pairs of true ribs.

False Ribs:

Definition:

Those ribs that do not connect with sternum directly but rather connect through the costal arch with sternum.

are called false ribs.

They are connected with vertebral column on dorsal side and with sternum through costal arch on ventral side.

Number;

There are 3 pairs of false ribs.

Floating Ribs;

Definition;

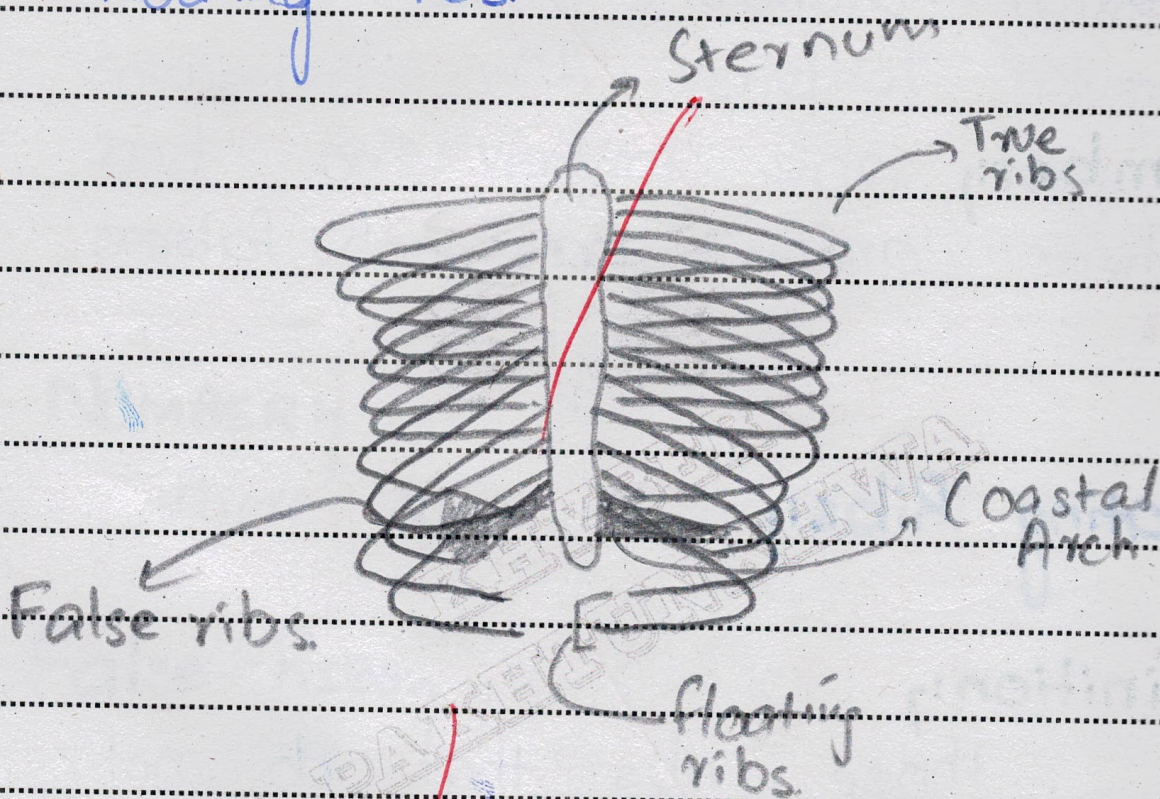
Those ribs that do not connect with sternum are called floating ribs.

They are connected with vertebral column on dorsal side

and are free floating
on ventral side.

Number:

There are 2 pairs of
floating ribs.



Part - 6

Define biotechnology - - - ?



BIOTECHNOLOGY:

Definition:

The branch of science which deals with the use of organisms and their deliberate manipulation of DNA for the welfare and benefit of human or to obtain certain products is called biotechnology.

It is a combination of technology and living organisms.

EXAMPLES TO DESCRIBE ITS IMPORTANCE:

Following examples will help to describe its importance.



INSULIN:

The human hormone insulin can be obtained through biotechnology. The genetic material of Escherichia coli is altered and human insulin gene is inserted so that it starts producing insulin which can be separated and then administered to diabetic patients.

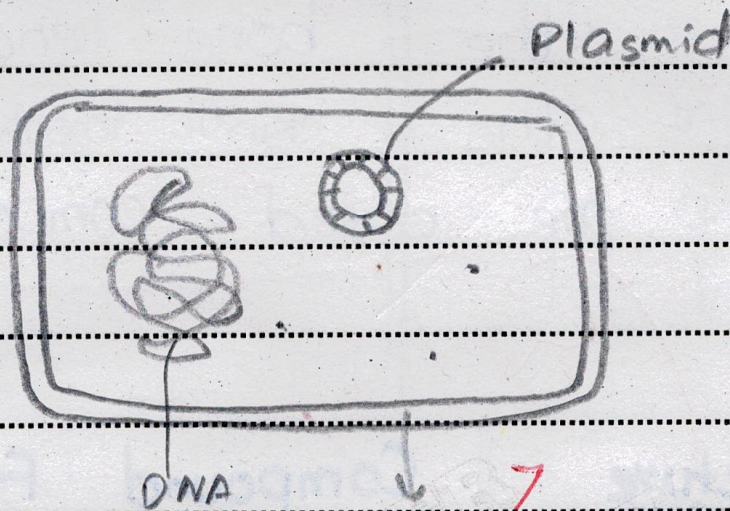
HUMAN GROWTH HORMONE:

The human growth hormone can also be obtained from microorganisms whose genetic material has been altered and the gene for human growth hormone is inserted. It is then administered to patients.



Other Examples;

Similarly, tissue plasminogen activator, interferons and antibodies etc. can also be obtained.



E.coli Bacteria producing insulin.

Part-7

Differentiate --- ?

SIMPLE FRACTURE;

Those fractures in which only the bone is



broken and no surrounding tissues and skin is damaged.

Compound Fractures:

Those fractures in which the bone ends penetrate the skin forming a wound are called compound fractures.

Simple Fracture

1) Skin Condition

Bone ends do not penetrate skin.

2) Surgery

Usually no surgery is required.

3) Healing time.

It takes comparatively less time to heal.

Compound Fracture

1) Skin Condition

Bone ends penetrate skin.

2) Surgery

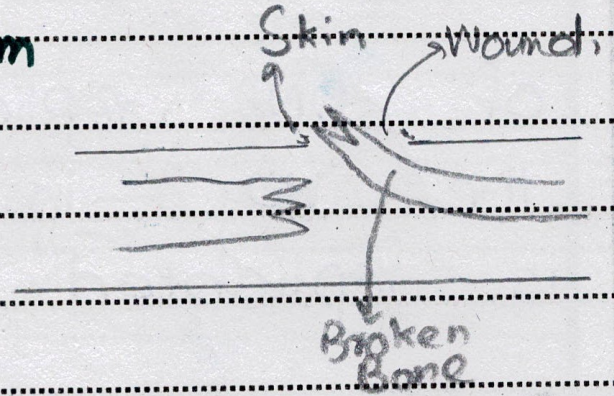
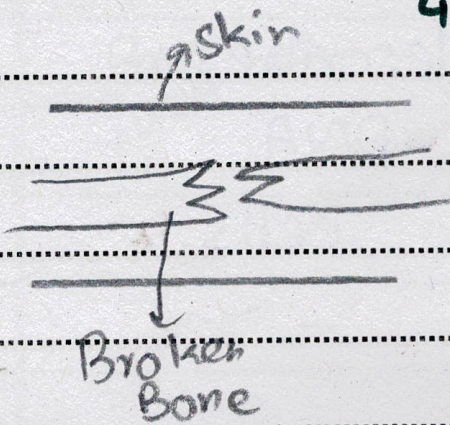
Surgery is required.

3) Healing time.

It takes more time to heal than simple fractures.



4) Diagram



5) Infection.

It is not susceptible to infection.

It is susceptible to infection as an open wound has formed.

Part - 8

What is semi -

SEMI - CONSERVATIVE MODEL:

INTRODUCTION:

Semi-Conservative model



of DNA replication describes the way in which DNA is replicated within cells.

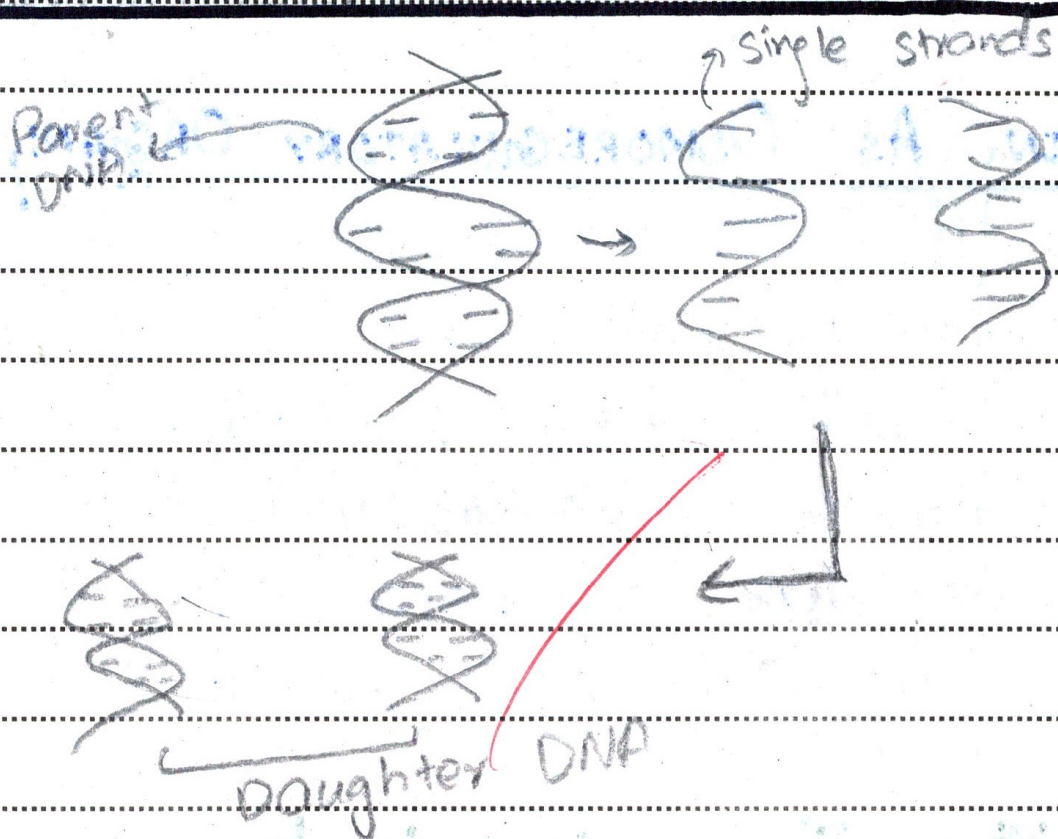
Proposed by:

This model was proposed/given by Watson and Crick.

Procedure:

According to this model, the both strands of DNA act as template for the synthesis of daughter DNA.

DNA molecule will unzip and a new daughter DNA molecule will be formed from each strand of the parent DNA molecule. Thus the daughter DNA will have one strand of parent DNA and another new strand formed by cell.



Significance:

This model successfully explains the way in which daughter DNA molecules are formed.

Part-9

Justify skin as an ?



SKIN As OSMOREGULATORY ORGAN;

The human skin can act as an osmoregulatory organ.

It employs several mechanisms to regulate temperature.

They are discussed below.

1) When Temperature is low;

When the body temperature is low, the hairs present on skin are erected by the hair erector smooth muscle present in skin.

The erected hair creates an insulative layer of air around skin which does not allow heat to escape.

→ Role of Thermoreceptors = ?

→ Role of Blubber = ?

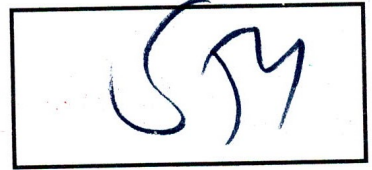
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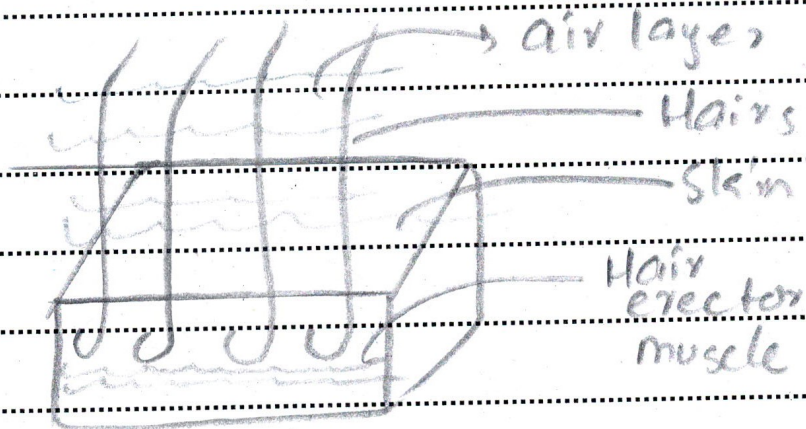


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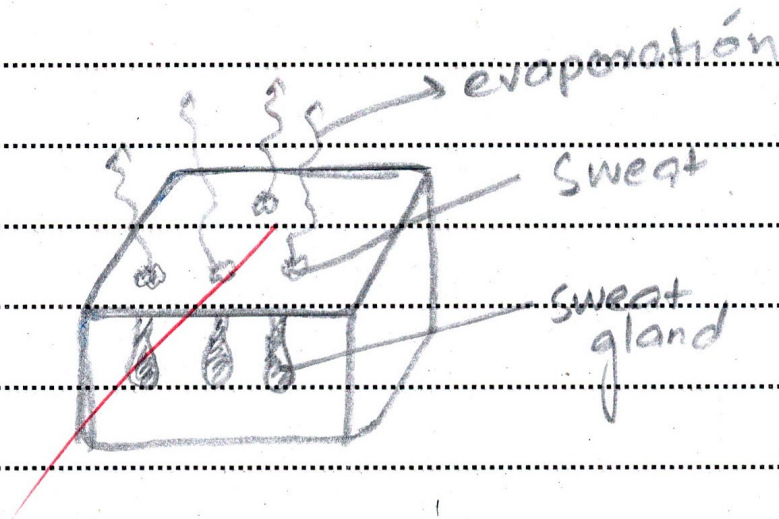


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2) When temperature is high;

When body temperature is high, blood flow to skin is increased which increase the amount of heat lost by radiation, convection and conduction. Also the sweat glands secrete sweat, which produces a cooling effect when the sweat is evaporated.



Part - 10

Differentiate between - ... ?

Resting Membrane Potential

Active Membrane Potential

1) Definition.

The membrane potential developed when the neuron is not conducting any impulse is called resting membrane potential.

The membrane potential developed when the neuron is conducting impulse is called active membrane potential.



2) State

The neuron is at rest.

The neuron is not at rest.

3) Impulse.

The neuron is not conducting impulses.

The neuron is conducting impulses.

4) Potential

Its potential measures upto -70 mV.

Its potential measures upto $+50$ mV.

5) Concentration.

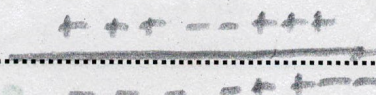
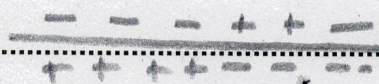
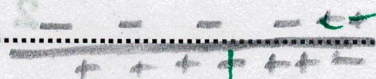
K^+ ions are greater inside, Na^+ are greater outside the neuron.

K^+ ions are greater outside, Na^+ ions are greater inside neuron towards the end.

6) Polarity

The inside of neuron is negative.

The inside of neuron becomes positive.



QUESTION-5

AXIAL SKELETON OF HUMANS:

INTRODUCTION:

The skeleton of humans which is present on the central axis is called axial skeleton.

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Division:

Axial skeleton is divided into following components.

- 1) Skull
- 2) Neck Bone
- 3) Ribs
- 4) Vertebral Column
- 5) Chest bone.

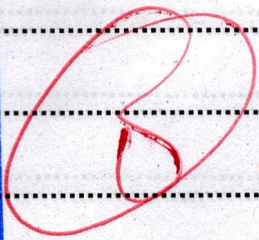
SKULL:

The human skull is composed of bones of face, of cranium, and of middle ear. They are 28 in number. These bones are formed by intramembranous ossification. They are further divided as such;



Cranial Bones;

These bones protect the brain. There are 6 types of bones, 2 of which are paired. They are given below.

- 
- 1) Frontal
 - 2) Occipital
 - 3) Sphenoid
 - 4) Ethmoid
 - 5) Parietal (paired)
 - 6) Temporal (paired)

Facial Bones;

They provide support to face, they are listed below. They are 14 in number.

- 1) Nasal Bone. (Paired)
- 2) Inferior nasal conchae. (Paired)
- 3) Mandible (Paired)
- 4) Palantine (Paired)



- 5) Zygomatic (Paired)
- 6) Lacrimal (Paired)
- 7) Vomer
- 8) Maxilla.

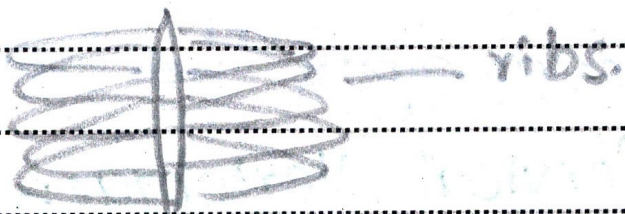
Ear Bones:

These are 6 in number,
3 in each ear. They are;

- i) Malleus
- ii) Incus
- iii) Stapes

NECK BONE:

It is a U-shaped bone present in neck at C3 level. It does not articulate with any other bone. It is called hyoid bone.

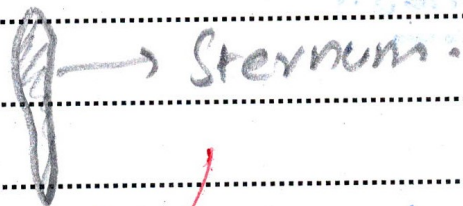


RIBS:

There are 12 pairs of ribs.
7 pairs are called true ribs. They



attach directly with sternum.
3 pairs attach with sternum through costal arch and are called false ribs. Remaining 2 pairs do not attach & float free.



STERNUM:

It is 1 in number. It is also called chest bones. Ribs attach with sternum.

VERTEBRAL COLUMN:

It is present on the dorsal side of body. It houses and protects the spinal cord. It is 33 in number and are divided as follows. Shock absorbing pads are present between the vertebrae.

Cervical Vertebrae:

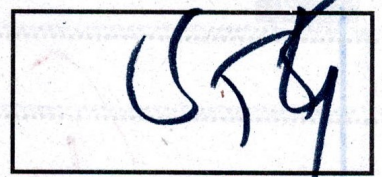
They are located in neck. They are 7 in number.

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Thoracic Vertebrae:

They are in chest region.
They are 12 in number.

Lumbar Vertebrae:

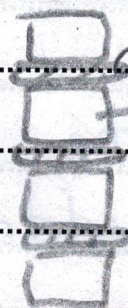
They are in lower back region. They are 5 in number.

SACRAL VERTEBRAE:

They are 5 in number.
They are below lumbar vertebrae.

Coccyx:

These are 4 fused vertebrae. They are the last in number.



disc.

Vertebral Column



Question - 6

Write a note ?

INSIGHT LEARNING;

INTRODUCTION;

It is a form of learning behaviour that uses reason instead of trial-and-error.

No Trial-and-Error;

In this learning, trial-and-error does not take place.

Solutions Appears Suddenly;

In this behaviour, the solution to a problems suddenly comes in one's



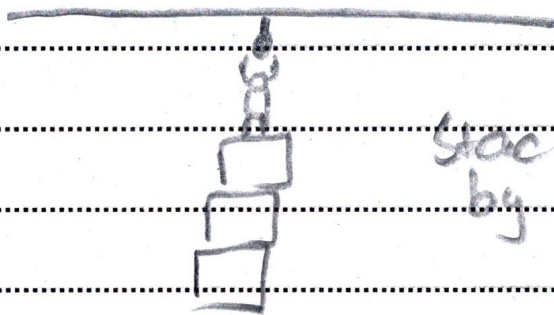
mind.

Example:

When we are solving a complex problem and we are stuck and suddenly the solution appears to our mind. It is insight learning.

Experiment:

Kohler placed a banana out of reach of chimpanzees and gave them some boxes. Instead of trial-and-error, the chimpanzees suddenly got the solution by stacking the boxes on top of each other and reaching the banana.



Stacking of boxes
by chimpanzees



(b)

Transport of CO_2 as Bicarbonate Ions;

INTRODUCTION;

The CO_2 in our bodies is transported out of our bodies through many ways. The most prominent among them is their transport as bicarbonate ions.

Major Mode;

It is the major mode of CO_2 transportation, representing 70% of total CO_2 .

Procedure;

CO_2 is transported as bicarbonate ions in following way.

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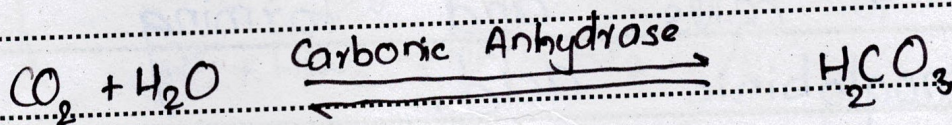
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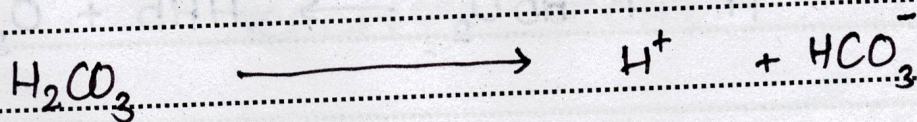
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1) Diffusion to Blood:

The partial pressure of CO_2 is higher in tissues than in blood where it diffuses to blood and to RBCs. In RBCs, it reacts with water to form hydrogen bicarbonate in presence of carbonic anhydrase enzyme.



H_2CO_3 dissociates as follows,



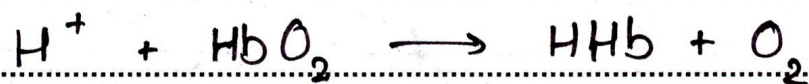


2) Chloride Shift;

The HCO_3^- ion is transported out of cell and Cl^- is transported inward through special bicarbonate-chloride carrier proteins in RBCs. This is called Hamburgers phenomena or chloride shift. Cl^- combines with K^+ and HCO_3^- combines with Na^+ .

3) Buffer Action;

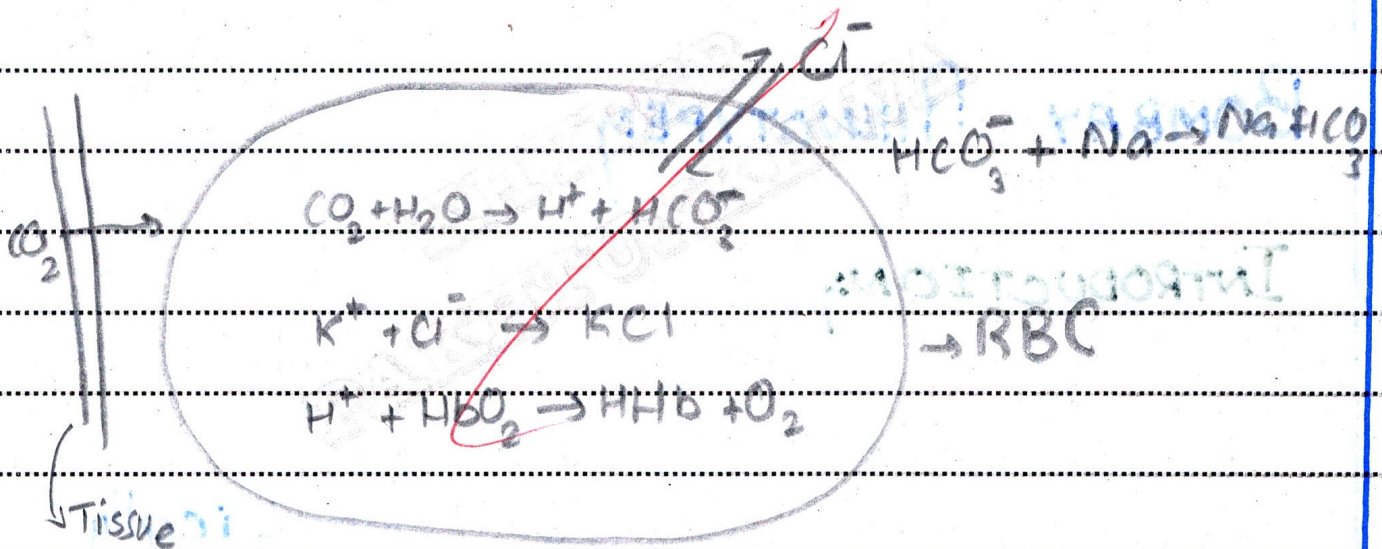
H^+ ions formed are buffered by haemoglobin, releasing O_2 to cells and forming haemoglobinic acid.





4) Disposal:

The blood goes to lungs where the partial pressure of O_2 is greater than CO_2 . So CO_2 in blood diffuses to lungs. For this, the HCO_3^- ions convert back to CO_2 by going in the reverse direction in above reactions and thus releasing CO_2 to environment.



in lungs, reverse of these reactions occur.



QUESTION - 4

Justify Bombay - - - ?

EPISTASIS:

The interaction between genes in which the effect of one gene hides or masks the effect of other gene, is called epistasis.

BOMBAY PHENOTYPE:

INTRODUCTION:

It is an example of epistasis. In it, a person is phenotypically O but genetically he/she is either A or B blood group.

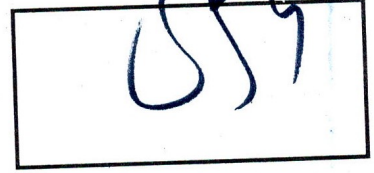
Precursor of Blood Group Antigen;
For formation

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of blood group antigen, H substance must be present which is its precursor. It is encoded for by H-gene present on chromosome 19.

Alleles of H-gene.

It has 2 alleles, H and h, Hh and HH synthesize H-substance while hh does not. In a person with H-substance, A and B blood group gene makes A and B enzyme which converts H-substance to respective antigens. In a person with hh-gene, no H-substance is present, therefore, even if A and B enzymes are present,



A and B antigen will be made because of lack of H-substance. So the person becomes phenotypically O even if the person is genotypically A or B.

Epistatic Gene:

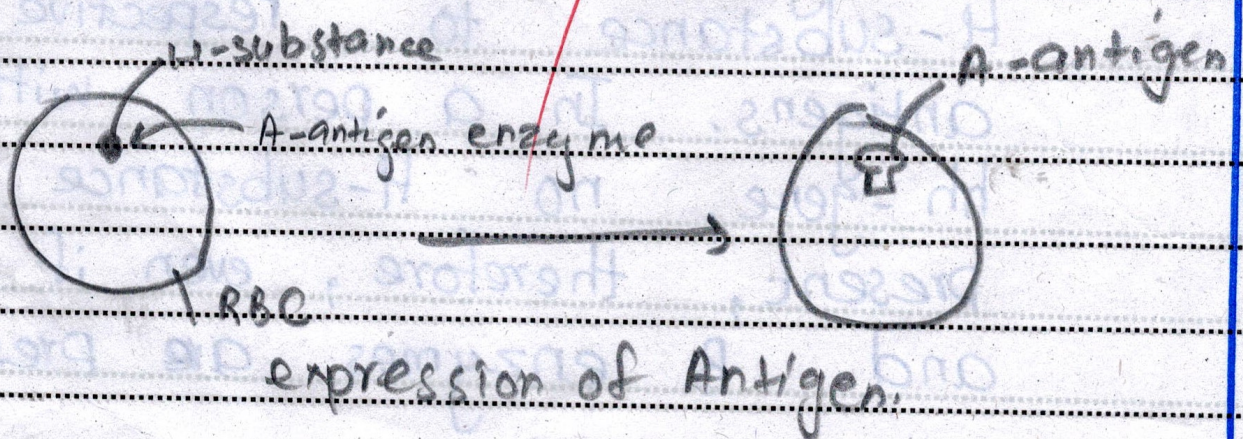
H-gene is epistatic gene.

Hypostatic Gene:

A and B ^{antigen} genes are hypostatic genes.

Conclusion:

Therefore it is an example of epistasis.





(b)

Write applications of PCR?

APPLICATIONS OF PCR;

Following are the applications of PCR.

1) Large No. of Copies;

PCR is used to create large no. of copies of target DNA within short time duration.

2) DNA Fingerprinting;

By PCR, large no. of copies of DNA which can be used in DNA fingerprinting.



3) Study of Pathogenic Organisms;

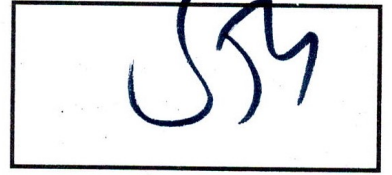
The DNA of pathogenic organisms is copied many times by PCR which can then easily be studied.

4) Safeguarding Isolated DNA;

Isolated DNA can be damaged by different processes. By making many copies of them, their safety is ensured.

5) Finding Criminals;

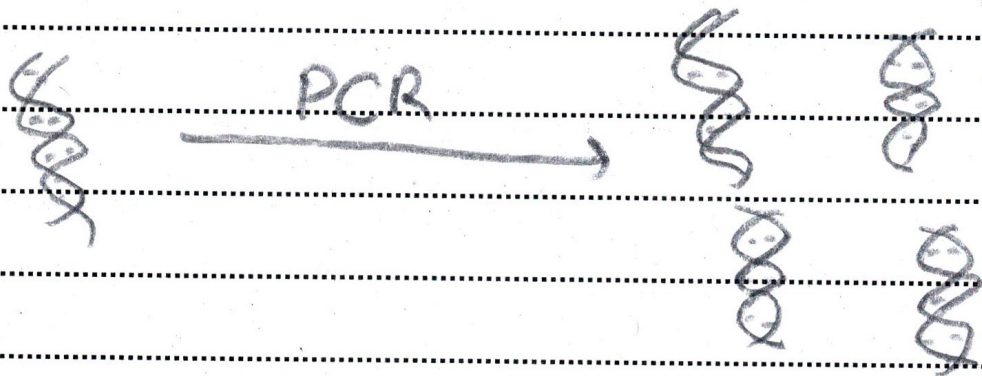
The DNA found at crime scenes can be enhanced many time by PCR which can then be used to identify criminals.



last

6) Study of Faulty Genes;

The faulty genes in human, after isolation is copied many times. It is then used to study that gene.



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