

Section : B

Question : 2

(i)

Antidiuretic Hormone :-

Antidiuretic hormone is secreted when the level of water in blood decreases.

→ Antidiuretic hormone form aquaporin channel on distal convoluted tubule of kidney i.e make the DCT more permeable to water. Thus water moves from DCT to the blood and thus level of H_2O is increased in blood.

→ High level ADH makes the urine concentrated.

→ Solute potential is achieved by ADH.

Diabetes Incipidus:

· Lack of ADH is

called diabetes incipidus.

Oxytocin:-

• oxytocin is derived from a word "onytocia" which means childbirth.

→ oxytocin binds to its receptors present on myometrium and start the contraction of uterus. Thus result in childbirth by positive feedback.

→ oxytocin also contract the mammary gland to release milk.

→ **contraction of urinogenital tract:**

oxytocin contract the urinogenital tract in male for sperm ejaculation.

iii

Statement:

Mendel choose Pea Plant (*Pisum Sativum*) for his experiments on plant hybridization. due to following reasons:

Reasons:

i): Pea Plant can easily be cultivated.

ii):- Pea plant has short life cycle of about three months.

iii):- Pea plant has self-fertilizing flowers.

iv):- Cross fertilization was also possible in pea plant.

v):- Pea Plant has seven distinguishable traits located on four different chromosomes.

Character	Dominant	Recessive
Seed Shape	Round	Wrinkle
Seed colour	Yellow	Green
Pod Shape	inflated	constricted
Pod colour	Yellow Green	Yellow
Flower Position	Axial	Terminal
Flower Height	Tall	Dwarf
Flower colour	Purple	white.

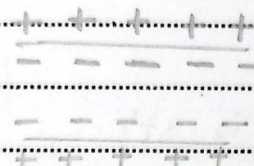
xii

Resting Membrane Potential:

Action Membrane Potential:

Def:

A neuron is said to be at RMP when there is more negative inside and positive outside neuron.



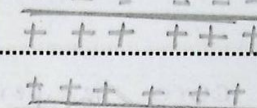
Value

It measures about -70mV

Neuron said to be polarized.

Neuron is not conducting impulses.

A neuron is said to be at AMP when there is more positive inside and negative outside neuron.

It measures about $+30\text{mV}$ or $+50\text{mV}$

Neuron is said to be depolarized.

Neuron conducts impulse.

X

Skin as thermoregulatory Organ:-

Skin acts as a thermoregulatory organ as it regulates the temperature of body.

High Temperature:-

The core temperature of body is 37°C . If the temperature of body increases then skin regulates the temperature by following ways:

(i):- Vasodilation:-

The diameter of the blood vessel of skin increases. Thus more blood flow to the skin and thus extra heat is lost from body through radiations.

(ii):- Sweating:-

Sweat gland in the skin secretes sweat due to which vapourization

occur and extra heat is released from body.

Low Temperature:

If temperature of body decreases then skin maintain the body temperature by following ways:

Vasoconstriction:

The diameter of blood vessels of skin decreases due to which less blood flow to skin and thus heat is retained in body.

→ Sweat Gland decreases secretion of sweat.

→ Goose Bumps occur which maintain the normal temperature of body.

v

Transcription:-

Def: The process of synthesis of mRNA from the DNA is called transcription.

Enzyme:

RNA polymerase is involved in transcription.

Steps:

Transcription occurs in three steps:

- i) Initiation
- ii) Elongation or Polymerization
- iii) Termination.

Occurance:

Transcription occurs in nucleus.

Translation:

Def:- The process of synthesis of protein from mRNA by ribosome is called translation.

Enzyme: Various enzymes are involved in translation like peptidyl Transferase etc.

Occurance:

Translation occurs in cytoplasm.

iv

Semi conservative Model of DNA Replication:

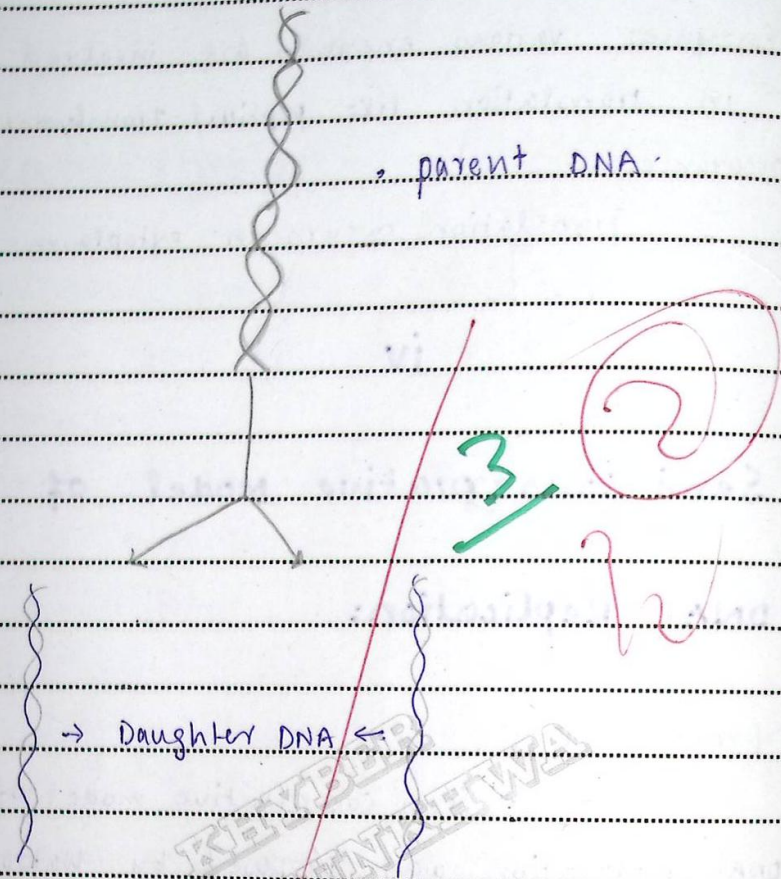
Proposed By:

Semi conservative model of DNA replication was proposed by Watson and Crick who proposed the structure of DNA.

Statement:

According to this model;

"The duplex of DNA unzips, lost its base pairs and each strand acts as a template strand. In this way DNA is partially conserved in daughter DNA."



DNA which undergoes replication is called parent DNA.

DNA produced by replication is called daughter DNA.

ix

True Ribs:-

Def: Those ribs which are directly attached to the sternum are called true ribs.

Number:-

They are seven pair in number.

False Ribs:

Def:

Those ribs which are attached to sternum through intercostal muscle are called false ribs.

Number:

They are three pair in number.

Floating Ribs:

Def:

Those ribs which are not attached to sternum are called floating ribs.

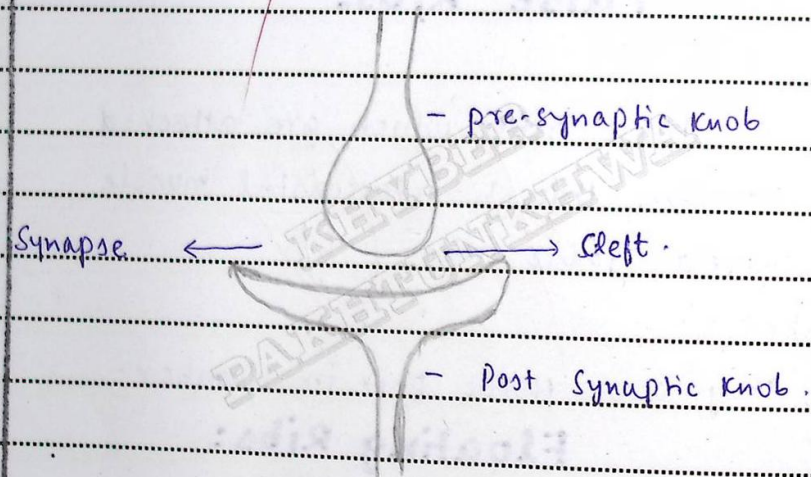
Number:

They are two pair in number.

xiii

Synapse :-

The junction or connection between the dendrite of one neuron and axon of another neuron through which impulses are relayed to the neuron is called synapse.



Synaptic cleft:

A microscopic gap present between the axon of neuron and its dendrite is called synaptic cleft.

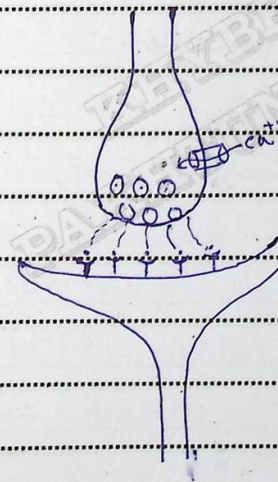
There are two types of synapse:

Chemical Synapse:

The type of synapse in which impulses are carried from one neuron to another neuron in the form of chemical messengers.

→ Synaptic delay is ~~not~~ present.

Synaptic cleft is about 20nm.



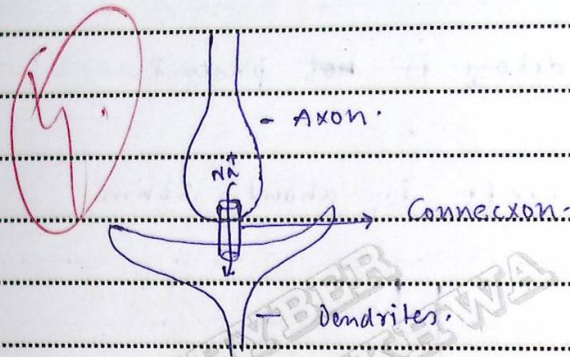
Electrical Synapse:-

The type of synapse in which impulses are carried

from one neuron to another neuron in the form of ions.

→ Synaptic delay is not present.

→ Synaptic cleft is about 0.2nm .



vii

Effects of deforestation on

Environment:

Following are the effects of deforestation on environment:-

Air Pollution:-

i)- It leads to air pollution which result in many health problems.

Global Warming:-

ii)- Deforestation causes global warming.

Desertification:-

iii)- Deforestation leads to desertification.

Soil Erosion:

iv)- Deforestation causes soil erosion due to which fertile land converts into desert.

Flooding:

v)- It is the main cause of flooding.

Endosymbiotic Theory of Evolution:-

a) Proposed By:-

Endosymbiotic theory of evolution was proposed by Lynn Margulis while doing a research in university.

b): Statement:

According to this hypothesis:

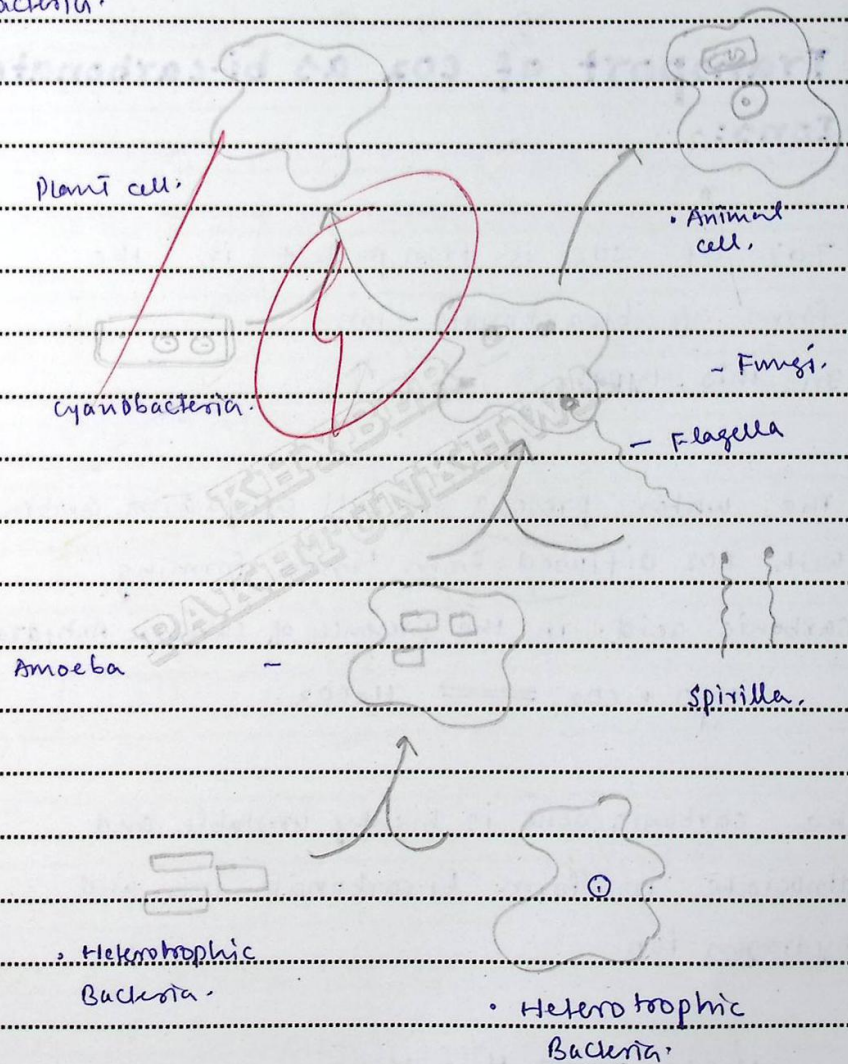
"Two mutual beneficial invasions of prokaryote cells by another prokaryote cell produced chloroplast and mitochondria as eukaryotic organelle."

Explanation:-

→ the ancestral mitochondria was a small heterotrophic bacteria capable of oxidation of food to produce energy. However, the ancestral chloroplast was an autotrophic, photosynthetic cyanobacteria.

Supportive Evidences:

- Mitochondria and chloroplast both divide by binary fission like bacteria.
- they both have 70S ribosomes like bacteria.
- they have circular double stranded DNA like bacteria.



Section : c

Question : 6

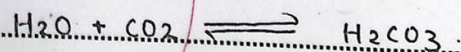
Part : b

Transport of CO₂ as bi-carbonate ions:

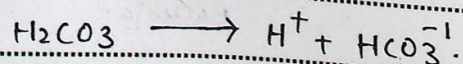
70% of CO₂ is transported in the form of bicarbonate ion.

In this type:-

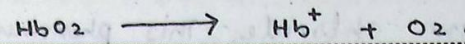
The water present in cell cytoplasm combine with CO₂ diffused from tissue forming carbonic acid in the presence of Carbonic Anhydrase.



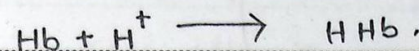
The carbonic acid is highly unstable and dissociate to form bi-carbonate ion and hydrogen ion.



→ The H⁺ produced in RBC decrease the pH of blood but it is buffered by haemoglobin.

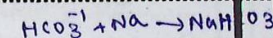
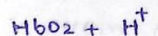


Haemoglobin combines with H⁺ and form haemoglobin acid.



→ Haemoglobin plays a key role in maintaining pH of blood i.e 7.4.

RBC

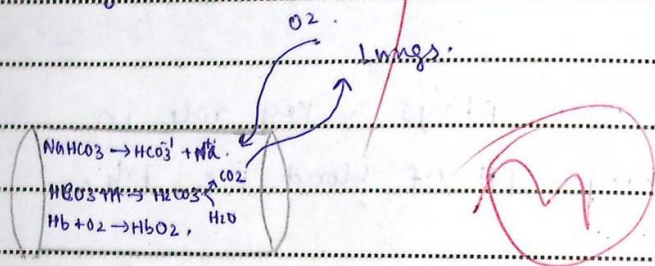


Tissue.

The bicarbonate ion is released to plasma where it combines with sodium forming sodium bicarbonate while the chloride ion

enter the RBC to balance the ions. It combines with potassium forming potassium chloride. This phenomenon is called chloride shift.

⇒ This reaction occurs reversible at the site of lungs:



Partial pressure is an important aspect in the transport of CO_2 . Gases always move from region of higher concentration to a region of lower concentration.

⇒ If the partial pressure of CO_2 is greater in tissues then haemoglobin oxygen association occurs.

⇒ However, if the partial pressure of CO_2 is lower in tissues then oxygen haemoglobin association occurs.

Part: a

Insight Learning:

The ability of an organism to respond correctly to a stimulus never experienced before is called insight learning.

or

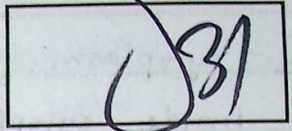
Learning by insight is the ability of an organism to find the solution of a problem suddenly by mental ability.

Complicated Behaviour:

Insight learning is an extreme case of behavioural modifications involving the application of reasoning to find a new solution.

Explanation:

In this type of learning, animals use its own judgement to solve a problem unlike by trial and error.



However, actual experience is not involved
in this type of learning.

Work of Kohler:

The example of insight
learning came initially in animals,
i.e. work of Kohler on Chimpanzee.

- Kohler first hanged a banana from ceiling of a room out of reach of chimpanzee.
- there were some wooden boxes and sticks scattered in same room.
- He then allowed chimpanzee to get in room. Hence, in short chimpanzee got the bananas suddenly by using mental reasoning.

Importance:

For this organisms solve problem
by using mental reasoning.

Question 3

Translation:-

The process of synthesis of protein from mRNA on ribosome is called translation.

Occurance:-

Translation occurs in cytoplasm of the cell in eukaryote. In prokaryote, the translation occurs in the cell membrane at sites called mesosomes, i.e. in the membranes of rough endoplasmic reticulum.

Steps in translation:

The process of translation is completed in 04 steps:-

a): Activation of Amino Acids:

Amino Acids are present in the inactive form

in cytoplasm. Amino Acids are activated by ATP inside cytoplasm in order to make bonds with tRNA.

Amino Acids that are ~~comb~~ or have become the part of polypeptide formation have been continuously activated throughout the process of translation.

Amino Acyl tRNA Complex:

For every amino acid, there is a specific tRNA.

→ A specific amino acid binds to tRNA with the help of amino acyl-tRNA synthase, forming amino-acyl tRNA complex.

→ Each amino acid attaches to the 3' end of particular tRNA.

2):- Formation of Initiation Complex:

Amino-acyl tRNA complex, ribosomal sub-units and mRNA combine to form a complex called initiation complex.

The process of translation actually begins with formation of initiation complex. First a tRNA carrying methionine binds to smaller ribosomal sub-unit. This binding is controlled by an enzyme called initiation factor.

At the same time, 5' end of mRNA also attaches to smaller sub-unit of ribosome with the help of another initiation factor. Initiation complex is completed when larger sub-unit of ribosomes is also placed upon smaller sub-units. Then the complex moves along 5' → 3' direction until it locates the AUG initiation.

Sites on Ribosome:

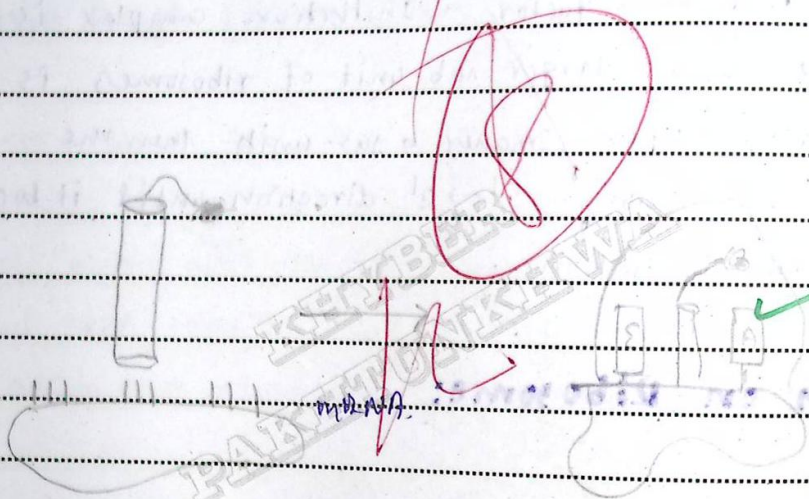
a):- Peptidyl Transferase:

The region where first amino acyl tRNA attaches is called p-site. In this region peptide bond is formed b/w successive amino acids.

b):- Amino-Acyl Site: The region on ribosome where t-RNA coming and bearing amino acids will be attached during elongation.

3):- Polypeptide Elongation:

During this phase the ribosomal units move along mRNA and amino acids are brought by tRNAs, toward ribosome continuously, which joined together to form polypeptide chains. In this way, new polypeptide chain is synthesized.

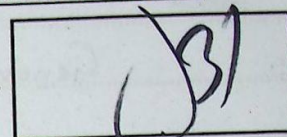


Termination phase is missing - ?



850

Fig. No.



(صرف پورا کا استعمال کیجئے) امیدوار ہمارا پتہ تحریر کریں

Question: 4

Part: b

Applications of PCR:

• PCR stands for polymerase chain reaction. Following are the applications of PCR:

a): Detection of pathogen:

→ PCR is an excellent technique in detection of pathogens causing disease. It is playing an ever-increasing role in the diagnostics and research technology.

b): Detection of mutations:

• PCR is a technique used to detect mutations that cause various diseases and cause cancer.

c): Genome Analysis:

Polymerase chain reaction is used for genome analysis and DNA sequencing reactions.

d): Criminology:

PCR is used in criminology for the detection of criminals on the basis of sample received from the incidents.

e): PCR is used to detect species of bacteria. over 6300 species are identified through PCR.

f): It is also used in the gel-electrophoresis.

Part: a

Bombay Phenotype:

Def:

The type of blood group which is phenotypically "O" but genotypically it may be blood group A, B or AB.

Discovery:

Bombay phenotype was discovered for the first time by Dr. Y.M. Bhende in Bombay (India) in 1902.

Abundance:-

Generally, the percentage of people with Bombay phenotype is 0.0004% and 0.01% in Mumbai.

Explanation:

The expression of ABO blood group system which is produced by gene I^A, I^B, i depends upon the presence of another H-gene present on chromosome 19.

The H gene produces substance "H" while gene I^A produces enzyme A, which modifies the substance into antigen A.

→ Similarly the i produces the enzyme " O^N " which modifies the substance to antigen " O^N " and the blood group becomes " O^N ".

2) However, if the H gene is present in recessive form on chromosome 19 the substance "H" is not synthesised. Due to which the blood group is not expressed as a result the person is phenotypically expressing "O" blood group.

$\Rightarrow$ now it is clear that in the substance " H^n " the person will be phenotypically " O^n " but genotypically it may be " A^n ", " B^n ", " AB " or " O^n ".

This is an example of epistasis because the gene on chromosome "9" masks the effect of gene on chromosome "9".

iqⁿ makes the effect of