

(Section B)

Q. No. 2 Part (i) Q: "Compare photosynthesis in plants."

Ans: Photosynthesis

Respiration

• photosynthesis in plants is anabolic process.

• respiration in plants is a catabolic process.

• it occurs only at day time

• it occurs all the time (night and day)

• it utilizes energy

• it releases energy

• reactants are CO_2 and H_2O .

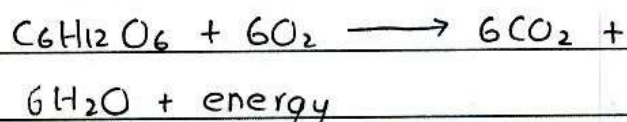
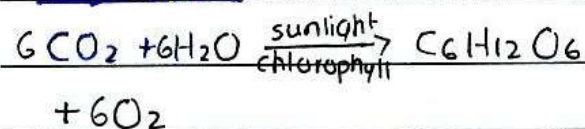
• reactants are $\text{C}_6\text{H}_{12}\text{O}_6$ and O_2

• products are O_2 and $\text{C}_6\text{H}_{12}\text{O}_6$.

• products are CO_2 and H_2O .

• Equation:

• Equation:



Q. No. 2 Part (ii) Q: "Enlist function of following."

Ans: Functions of the following lobes of brain are given as:

	Name:	Function:
i)	Frontal Lobe	responsible for movement of skeletal muscles
ii)	Occipital lobe	responsible for vision
iii)	Temporal lobe	responsible for hearing and smelling.

(Section B)

Q. No. 2 Part (iii) Q: "Briefly describe warm weather."

Ans: Adaptations of skin in Cold Weather:

- i): The arrector pili muscle is raised and a layer of air is trapped underneath, which results in goosebump formation and insulates the skin.
- ii): Blood vessels are constricted (vasoconstriction) less blood flows through them and less heat is lost.

Adaptations of Skin in Warm Weather:

- i): The arrector pili muscle is lowered and no air is trapped.
 - ii): Blood vessels dilate (vasodilation) more blood flows through them, and more heat is lost to environment.
 - iii): Activity of sweat glands increases and more sweat is produced which cools the body.
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Q. No. 2 Part (iv) Q: "Describe commensalism two examples."

Ans: Commensalism: It is the interaction between organisms in which one organism is benefitted and the other organism is neither benefitted nor harmed.

Examples:-

i): Epiphyte plant grows on top of trees to get better sunlight, but it does not derive nutrients from the host and doesn't cause any harm to it.

ii): Sucker fish attach themselves to the bottom of sharks in order to move towards better feeding grounds.

(Section B)

Q. No. 2 Part (v) Q: "Write a note on single cell protein."

Ans: Single Cell Proteins:

SCPs are edible, unicellular microorganisms' product produced by culturing algae, yeast, fungi or bacteria. Microorganisms with 30-70% protein content are used. SCPs are used as meat substitutes in different parts of world.

Advantages:

- i): it has small land requirement.
- ii): it has short doubling time.
- iii): its production is not affected by weather conditions.

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Q. No. 2 Part (vi) Q: "Compare transcription and translation."

Ans: Transcription

Translation

- | | |
|--|--|
| • Transcription is the first step of protein synthesis | • Translation is the second step of protein synthesis. |
| • In this step message of the DNA is copied in form of messenger RNA (mRNA). | • In this step, RNA decodes the message and joins specific amino acids to form proteins according to it. |
| • Only mRNA plays role in this step. | • tRNA and rRNA also play role in this step. |

(Section B)

Q. No. 2 Part (vii) Q: "Determine F_1 and F_2 4'o clock plant."

Ans: 4'o clock plant shows incomplete dominance. Cross of true breeding red and white flower is as follows:

Cross: (Punnet Square):

red flower

R_1R_1

P generation

R_2R_2

white flower

gametes

R_1

R_2

F₁ generation

R_1R_2

pink flower

F₂ generation

	R_1	R_2
R_1	R_1R_1	R_1R_2
R_2	R_1R_2	R_2R_2

genotype ratio of R_1R_1 , R_1R_2 and R_2R_2 = 1 : 2 : 1

phenotype ratio = 1 : 2 : 1 (red : pink : white)

• F₁ generation has all pink flowers

• F₂ generation has pink, white and red flowers.

Q. No. 2 Part (viii) Q: "Differentiate between variation."

Ans: <u>Discontinuous Variation</u>	<u>Continuous Variation</u>
• shows clear cut phenotypes with no intermediate form.	• shows wide range of phenotype from one extreme to other.
• controlled by alleles of a single gene pair	• controlled by many genes which show combined effect.
• not modified by environmental conditions.	modified by environmental conditions.
• <u>Example:</u> ABO blood groups, ability to roll tongue etc.	• <u>Example:</u> height, intelligence (IQ), skin colour etc.

(Section B)

Q. No. 2 Part (ix) Q: "Describe functions of in the body."

Ans: i) Antidiuretic Hormone:

ADH, secreted by posterior lobe of pituitary gland is responsible for reabsorption of water in nephrons. Its under-secretion causes diabetes insipidus.

ii) Adrenaline:

It is secreted by adrenal glands in emergency situations. It raises blood pressure, rate and intensity of heart beat, blood flow to limbs, which prepares body to face emergencies.

iii) Oestrogen:

It is secreted in females by gonads. It is responsible for appearance of secondary sexual characteristics at puberty.

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Q. No. 2 Part (x) @: "How do bacteria antibiotics."

Ans: Resistance Against Antibiotics:

Bacteria may acquire resistance against antibiotics in the following ways:

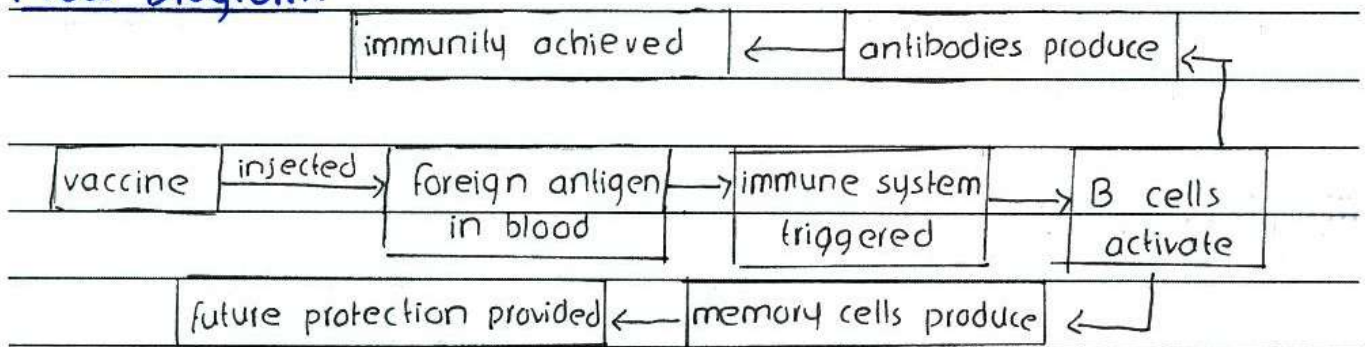
- i): Overuse of antibiotics which may change bacteria's genetic structure and make them immune to antibiotics.
- ii): Mutation
- iii): Transfer of resistance from one bacterium to another through plasmids during conjugation.

Q. No. 2 Part (xi) Q: "Briefly describe mode of vaccines."

Ans: Mode of Action of Vaccines:

Vaccines are weakened or dead pathogens. They improve immunity by injecting foreign substance (antigen) in blood which triggers immune system to produce antibodies, which are proteins capable of neutralizing antigens. Vaccines prevent and reduce disease symptoms from showing. Memory cells are also produced to provide protection against future diseases.

Flow Diagram:



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Q. No. 3 (Page 1) Q: "Discuss the mechanism of breathing."

Ans: BREATHING: Definition:-

Breathing refers to the exchange of gases (oxygen and carbon dioxide) that takes place in organisms. It is a physical process that performs the function of gaseous exchange in organisms.

Steps of Breathing:

Breathing consists of two steps or phases:

(1): Inhalation or inspiration

(2): Exhalation or expiration

1: Inhalation (Inspiration):-

The process of breathing in is known as inhalation.

Following occurs in process of inhaling:

i): Movement of Diaphragm:

The diaphragm contracts and flattens, which increases volume of thoracic cavity.

ii) External intercostal Muscles:

The external intercostal muscles contract.

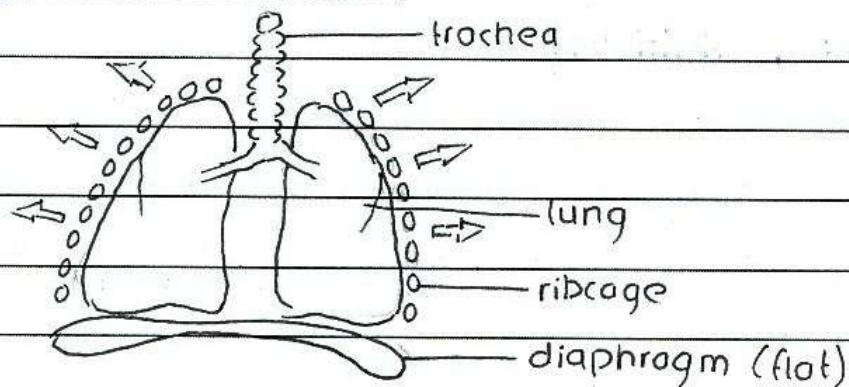
iii): Pressure / Volume:

The ribs move upward and outward. Volume in the chest cavity increase. As a result pressure in the chest cavity decreases.

iv): Movement of air:

Air moves inside the lungs to equalize the reduction of air pressure in thoracic cavity.

Q. No. 3 (Page 2)

Diagram:- (Inhalation)INHALATION2: Exhalation (Expiration):-

It is the process of breathing out. Following steps occur:

i): Movement of Diaphragm:

Diaphragm relaxes and becomes normal, dome shaped.

ii): External intercostal muscles:

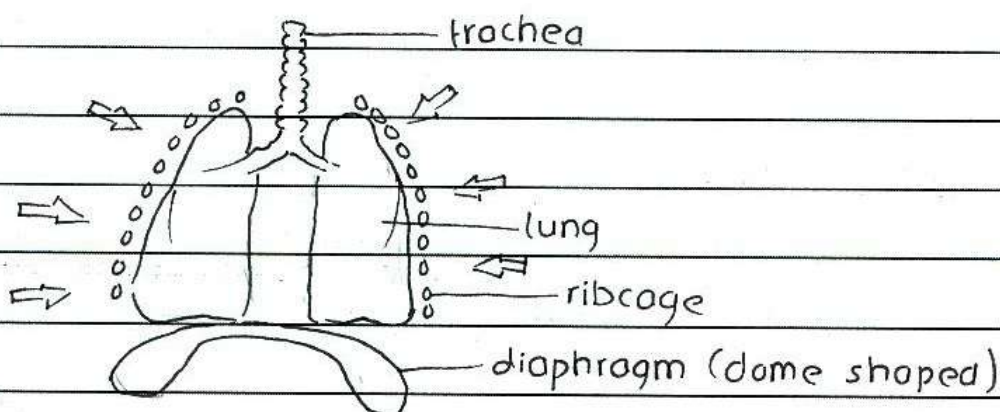
External intercostal muscles, between ribs, relax.

iii): Pressure / Volume:

The ribs move inward and downward. Volume in the chest cavity decreases. As a result, the pressure inside the chest cavity increases.

iv): Movement of Air:

Air moves out of the lungs to equalize increase in pressure.

Diagram: (Exhalation)EXHALATION

Q. No. 4 (Page 1) Q: "Describe Law of segregation with example of plant height upto F_2 generation."

Ans: LAW OF SEGREGATION:-

Mendel's Pea Plant Experiment:

Mendel explained the laws and patterns of inheritance with the help of his pea plant (*Pisum sativum*) experiment. He studied seven pairs of contrasting traits (i.e. traits with sharp differences) of the pea plant.

Law of segregation was formulated by Mendel when he studied all the seven traits one by one, i.e. he studied each pair of traits individually.

Plant Height Experiment:

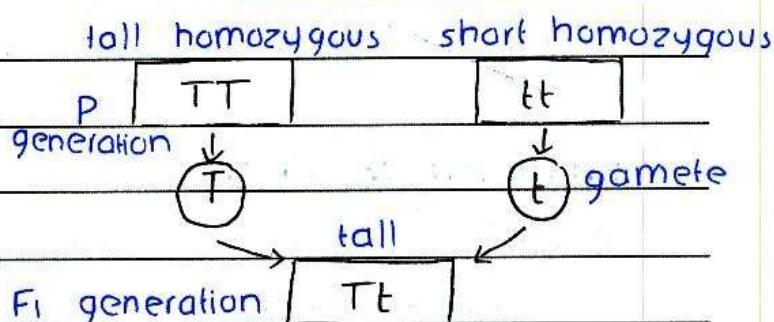
In one of his experiments regarding plant height (which may be tall or short), he crossed true breeding plant varieties of tall and short plant. True breeding parents are the ones which produce offspring of their own kind in successive generations if self fertilization takes place.

Cross: (Punnet Square):

F_1 Generation:

The parental generation is denoted as P. The cross in P generation produced F_1 generation.

All offspring of F_1 generation were tall. This shows that only dominant allele shows its effect in F_1 generation.



F_2 generation		T	t
	T	TT	Tt
	t	Tt	tt

Q. No. 4 (Page 2)

Monohybrid:

Mendell called them monohybrid, i.e. hybrid in one trait.

Hybrid is a variety produced by crossing contrasting true breeding parents.

F₂ Generation:

Offspring of F₁ generation are called F₂ generation. The recessive factor which failed to express in F₁ generation appeared again in F₂ generation.

Genotype ratio = 1 : 2 : 1 (TT : Tt : tt)

phenotype ratio = 3 : 1 (tall to short)

Conclusions of Mendel:

- i): True breeding varieties possess two alleles for a given trait.
- ii): Only dominant allele shows effect in F₁ generation.
- iii): Alleles retain their individuality in F₁ generation.
- iv): Recessive factor which failed to express in F₁ generation appears again in F₂ generation in homozygous condition.

Statement of Law:

On basis of these conclusions, Mendel formed law of segregation which states:

"Traits of organisms are determined by two alleles which separate in gametes and reunite again at fertilization."

Q. No. 5 (Page 1) Q: "Draw labelled diagram of structure of ear."

Ans: EAR: Introduction:

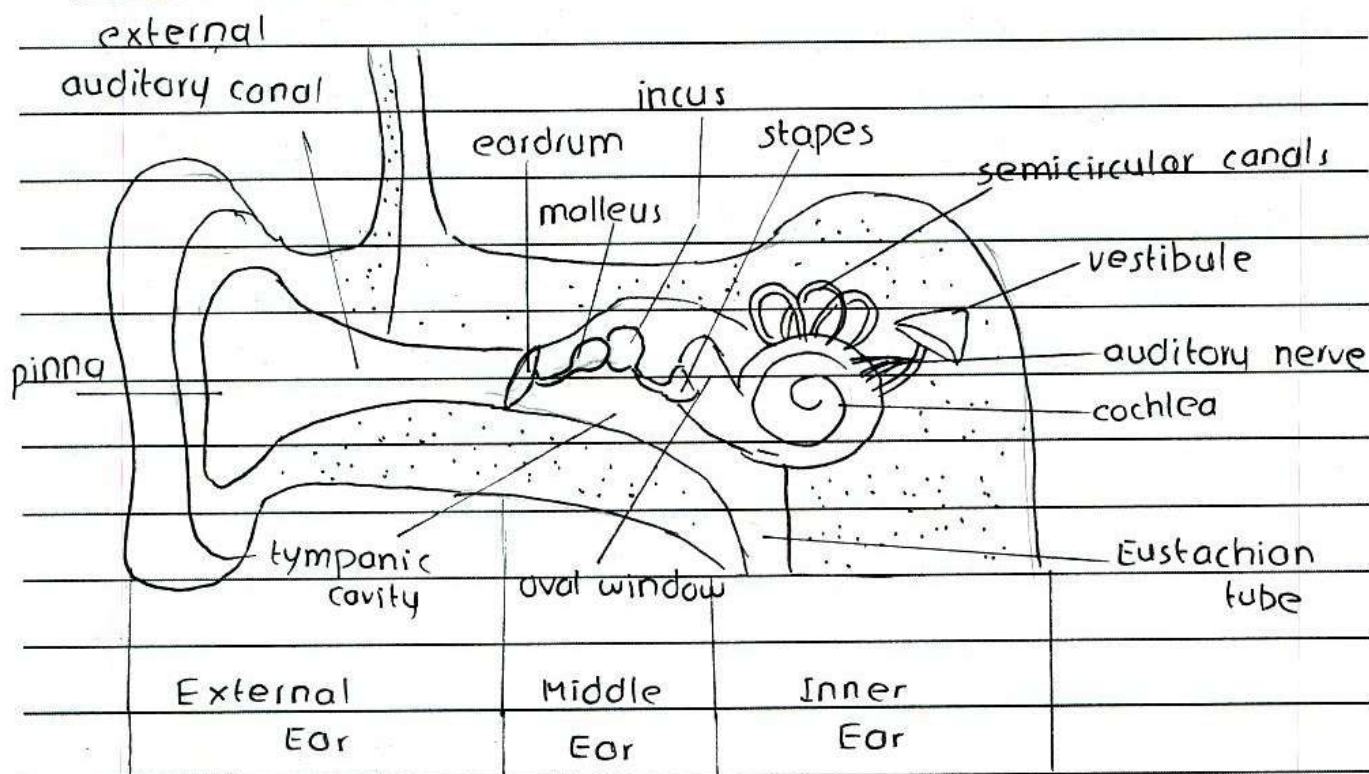
Ear is the organ of hearing. It is divided into three parts which are:

(i): External Ear

(ii): Middle Ear

(iii): Inner Ear

Diagram of Ear:



STRUCTURE OF EAR

Explanation:-

i): External Ear:

External ear consists of outer funnel like structure called pinna, auditory canal and ear drum.

Q. No. 5 (Page 2)

Middle Ear:

Middle Ear consists of three auditory ossicles : malleus, incus and stapes. They amplify and transmit vibrations from ear drum to inner ear. They serve as bridge for transmitting vibrations. Eustachian tube connects throat with middle ear to equalize air pressure on both sides which is necessary for proper hearing.

Inner Ear:

Inner ear consists of cochlea, vestibule and three semi-circular canals. vibrations strike the cochlea which has sound receptors and vibrations are sent to brain through auditory nerve and are interpreted as sound. Vestibule and semi-circular canals balance the body, and detect change in body position or rotational acceleration of head.

Q. No. 6 (Page 1) Q: "Describe negative feedback mechanism with example of secretion of hormones."

Ans: The secretion of hormones is controlled by feedback mechanism. It is of two types:

(i): Positive feedback mechanism

(ii): Negative feedback mechanism

NEGATIVE FEEDBACK MECHANISM:

Negative feedback mechanism is the process by which the output of a process stops or inhibits the process, i.e. the net outcome of the process is such that it stops the process.

Maintains Homeostasis:

Negative feedback mechanism is more common in living organisms as it is homeostatic and brings conditions back to normal.

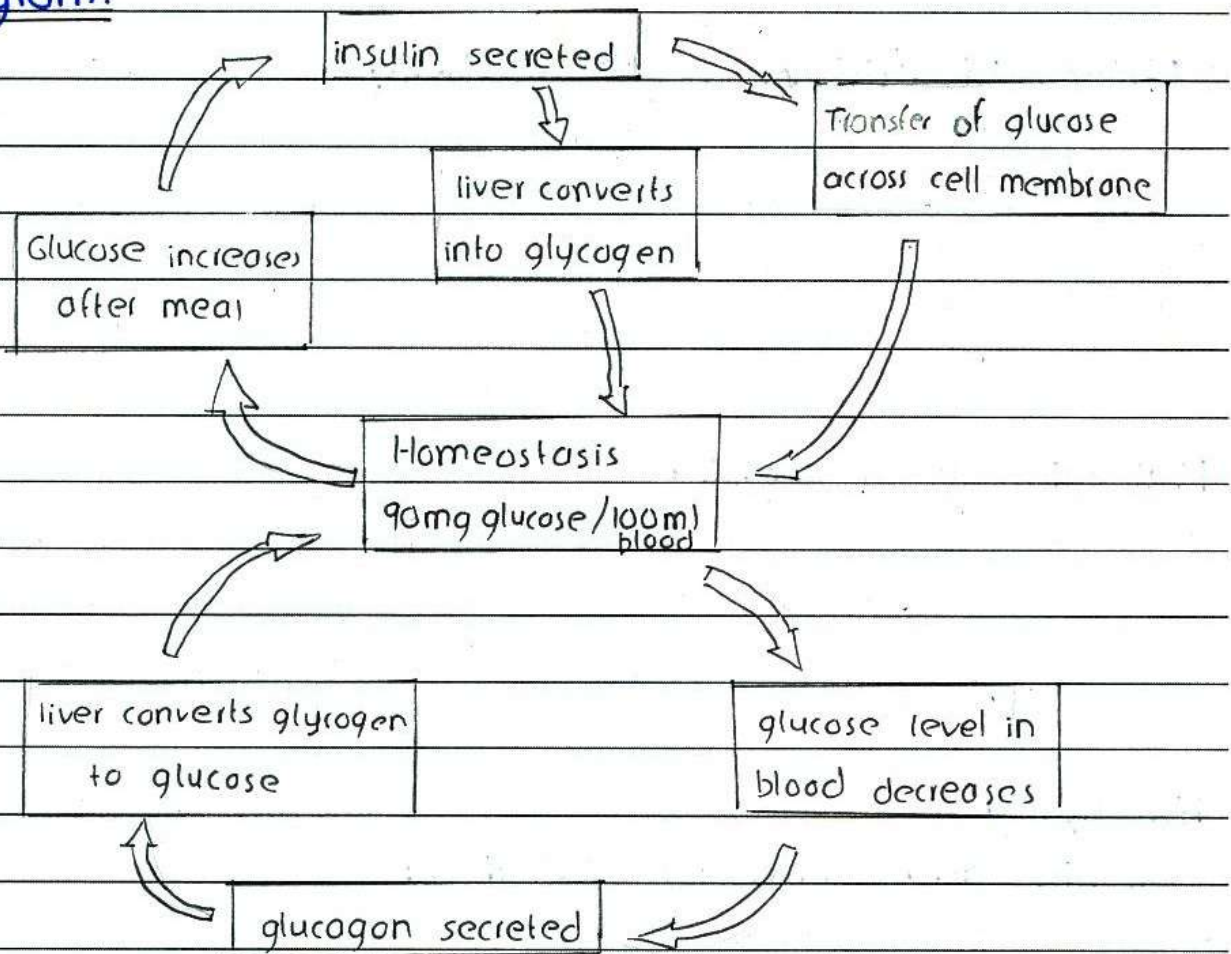
Example :-

Insulin and Glucagon secretion:

- Insulin is a hormone secreted by beta cells of pancreas when blood sugar level is high such as after a meal. Insulin facilitates transport of glucose across cell membrane and allows liver to convert extra glucose into glycogen in liver. As a result, glucose concentration in blood becomes normal. The normal concentration of glucose in blood is output of process which inhibits further insulin secretion.

Q. No. 6 (Page 2)

- Glucagon is secreted by alpha cells of pancreas when blood sugar level is low. It converts glycogen in the liver to glucose. As a result, glucose concentration in blood increases and becomes normal. This is the output of the process which inhibits further glucagon secretion.

Diagram:

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