

Q. No. 2 Part (i) Haemodialysis

Dialysis; cleansing of blood using artificial ways is dialysis.

Haemodialysis; In haemodialysis,

- 1- Patient's blood is pumped through an apparatus called a dialyzer.
- 2- It consists of long tubes the walls of which act as semi-permeable membranes.
- 4- The dialysis fluid surrounds the long tubes of the dialyzer. As blood flows through the tubes, waste materials diffuse from the blood into the surrounding fluid across the tubes.
- 5- In this way ^{blood is} cleansed and returns back to the body. It must be done at a kidney centre, thrice ^a week.

Q. No. 2 Part (ii) Bones: Middle ears

The middle ear consists of three bones or middle ear ossicles;

1. Malleus: connected to tympanum (ear drum).
2. Incus: middle ~~ea~~ bone between malleus and stapes.
3. Stapes: smallest bone of the human body.

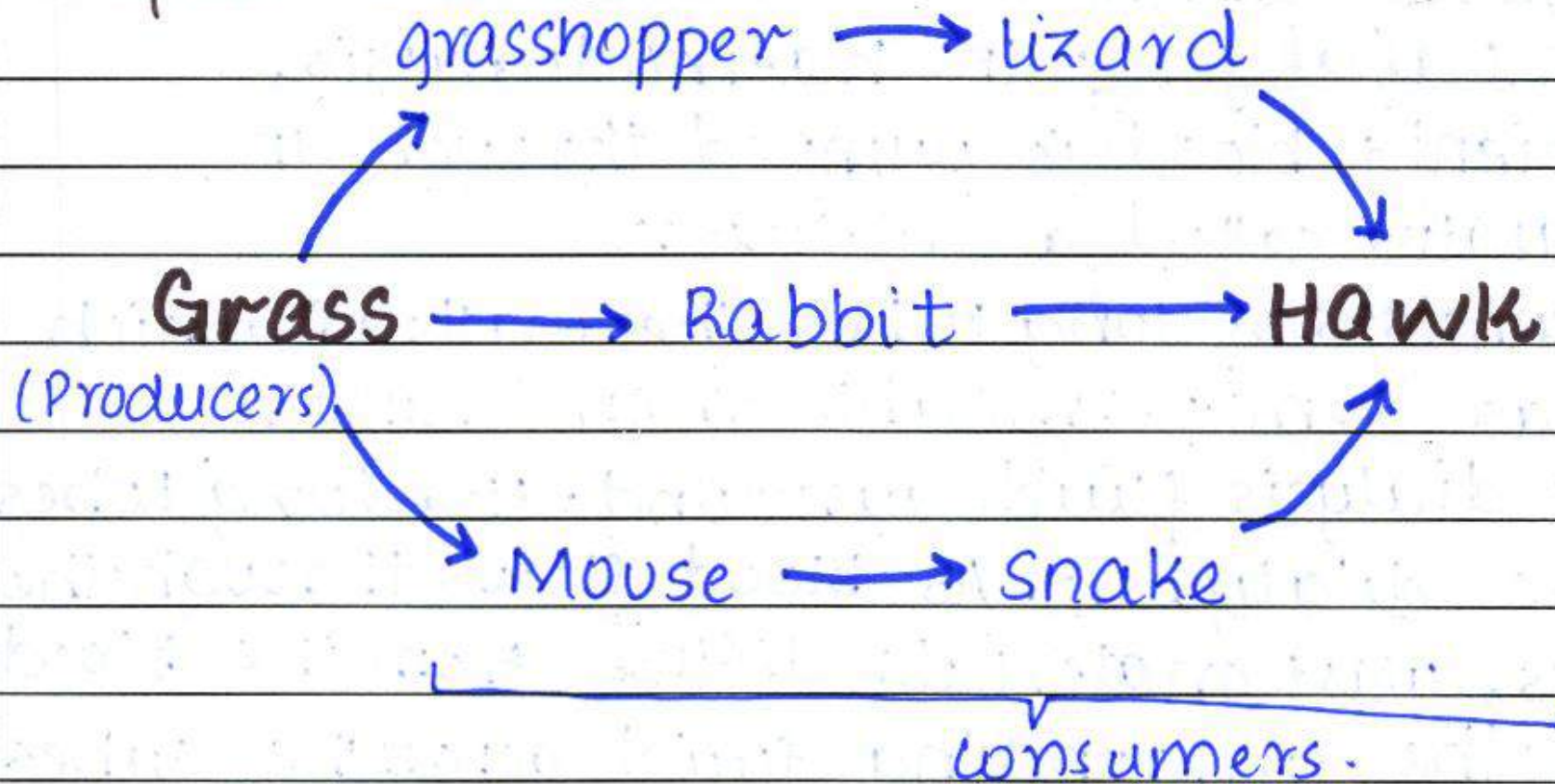
Parts of the Inner ear

- 1- Vestibule: Present at the centre of the inner ear and maintains body balance.
- 2- Semicircular canals: Posterior to vestibule.
- 3- Cochlea: Three ducts wrapped in a coiled form ~~th~~ with sound receptor cells in the fluid filled middle duct.

Q. No. 2 Part (v)

Food Web

"A network of food chains interlinked at various trophic levels."



Q. No. 2 Part (vi)

Definitions

Osteocytes: Cells present in the matrix (collagen fibres) of a bone are called osteocytes.

Hinge Joint: A moveable joint that allows 180° movement from one side to another in a plane ^(left to right) is called the hinge joint. It allows half of a 360° rotation only.

e.g:- knee joint, elbow joint.

Ligaments: Tough, but flexible (elastic) bands of collagen fibre present between bones at joints are called ligaments. They prevent joint dislocation.

Q. No. 2 Part (vii)

Importance : Features of Respiratory Tract

(a) C-shaped cartilage in trachea: There are C-shaped cartilaginous rings in the trachea. These prevent the trachea from collapsing ^{even} when there is no air in it.

(b) Larynx: Larynx, a box-like structure made up of cartilage, has two pairs of fibrous bands stretched across it. When air moves through them, they vibrate producing sound. Larynx is thus also also a "voice box" and is important to produce sound. Together with ^{other} movements, ^{speech} results.

Q. No. 2 Part (viii)

Selection of Pea Plant for Experiment

Mendel selected pea plant for his experiment due to the following characteristics it has;

(1)- It has short, but fast life cycles.

(2)- It is self-pollinating, but cross pollination is also possible.

(3)- It has a number of traits (seed shape, seed colour, pod shape etc) that can be studied at the same time.

(4)- It has contrasting phenotypes for a trait. For example, for the trait of height, there are contrasting phenotypes of tallness and dwarfness.

Q. No. 2 Part (x)

Pneumonia

Def; Pneumonia is an infection of the lungs. If it affects both the lungs, it is called double pneumonia.

Causatives; Bacterial species [Streptococcus pneumoniae], certain viral infections [influenza virus] and fungal infections may lead to it.

Symptoms; shivering, fevers and chills, cough with sputum production and purplish complexion due to poor oxygenation of blood.

Infection; lungs are filled with pus and fluid as the causative organism settles in alveoli and destroys ^{lung} tissues.

Cure; For pneumonia caused by Streptococcus pneumoniae, there are vaccines available.

Q. No. 2 Part (xi)

Single Cell Proteins (SCP)

Def: The extraction of protein content from a pure or mixed culture of microorganisms is called single cell proteins.

Microorganisms: Microorganisms used include bacteria, algae, fungi etc.

Significance: (1) - It is an environment friendly process as it uses agricultural wastes and industrial waste and produces no pollution.

(2) - SCPs have high vitamin content

(3) - They are independent of seasonal variations.

(4) - They have high yield. E.g: Pond algae produces 20 tonnes of dry protein (20-50 times higher than corn) and 250kg yeast gives 50 tonnes of proteins (in 24 hours).

Q. No. 2 Part (xiii) Mode of Action: Vaccines

Vaccines; A material containing a weakened or killed form of a pathogen that provides immunity by stimulating antibody formation.

Mode of Action:

- 1- When a vaccine is introduced in the body, B-lymphocytes stimulate production of antibodies.
- 2- Antibodies attack the pathogen (recognizing it as an enemy) and destroy it.
- 3- These vaccines remain in the blood stream and provide protection against future infections caused by the pathogens.
- 4- Vaccination is also called immunization.

Q. No. 2 Part (xii)

Fermenters : Importance

Def: A device that provides an optimum environment for the growth of a microorganism into a mass culture that interacts with the substrate to give desired products is a fermenter.

Importance:

- 1- The fermentation proceeding in the fermenter can be controlled used various factors like growth inhibitors, pH, oxygen supply etc.
- 2- It is an inexpensive process.
- 3- It can be used to produce desired substance in bulk quantities.
- 4- It is environment friendly.

Q. No. 2 Part (xiv) Narcotics : Sourced from Opium

Narcotics; Drugs that relieve pain by acting on the central nervous system are called narcotics. [e.g: codeine, morphine].

Use:

1-given to those suffering from chronic illnesses like cancer

2-given to relieve post-surgical pain.

Sources; OPIUM (morphine, heroine)

MORPHINE: It is sourced from juice of opium poppy plant. It is a strong pain reliever as it instantaneously acts on the CNS to relieve pain.

HEROINE: It is ^{semi synthetic and} sourced from morphine, hence opium indirectly. It induces drowsiness ^{and} relieves pain.



Q. No. 2 Part ()

A series of horizontal lines for writing, with a diagonal line crossing through them from the bottom-left to the top-right.

Q. No. 4 Part (a) (Page 1/2) Receptors in Human
Body : EYE

Eye; The eye is a receptor of light in the human body and ~~mo~~ organisms.

Location; The eye is located in the "eye socket" or "orbit of eye".

Structure;

Eye lids wipe the eye and spread tear on the eye. They protect the eye as tears contain a substance that prevents bacterial infections.

Brows prevent finer particles from entering into the eye.

Structure of eye is divided into 3 layers:

- (i) Sclera (ii) Choroid (iii) Retina

(Kindly refer to blank page for diagram.)

Functions of the layers of Eye;
[MIDDLE LAYER + INNER LAYER]

ii- Choroid : Middle Layer

Middle layer of the eye is choroid. It contains blood vessels and so is darker in colour. In front of the eye, choroid bends to form a muscular ring called "iris". In the centre of the iris, there is a pupil which admits light into the eye.

Function;

(a) - Blood vessels give choroid a dark colour which prevents disruptive reflections with the eye.

(Page 2/2) (b) - Iris admits light into the eye. Depending upon the light intensity, muscles of iris contract or relax changing size of pupil. (kindly refer to blank page)

BRIGHT LIGHT: when light intensity is high pupil constricts to reduce light entering the eye. During this, circular muscles contract, radial muscles relax.

DIM LIGHT: circular muscles relax, radial muscles contract, so pupil dilates to admit maximum light.

(iii) - Retina: Inner Layer

Structure; The inner, photosensitive layer of the eye densely packed with rods and cones is retina.

Rods: They are sensitive to dim light.

Cones: They are sensitive to bright light and are largely involved in sharpness of image and colour distinction.

Retina consists of fovea and optic disc.

Fovea: A dip in the retina opposite to the lens in fovea. Packed with cones, it is where light rays converge and image forms.

optic disc: Blind spot of the eye ^{from} where optic nerves enter the eye. It has no photosensitive cells, hence is called "blind spot".

Function; Retina is responsible for image formation.

Biogeochemical Cycles;

CARBON CYCLE

Biogeochemical Cycles;

Def; Cyclic pathways through which elements essential for living organisms move from the environment ~~into~~ to the living organisms and then return from organisms to the environment again are called biogeochemical cycles.

Carbon cycle;

Natural sources of carbon in the environment;

1. **Allotropes:** carbon, a principle block for many biomolecules occurs naturally in graphite, diamond.
2. **Fossil Fuels:** coal, petroleum, natural gas, peat lignite are densely packed with hydrocarbons.
3. **Earth's Crust:** carbonates in the Earth's crust give rise to carbon dioxide CO_2 .

Human Sources;

4. **Fuel Combustion:** Burning of fuel in industries, automobiles etc adds CO_2 to the environment.

Movement into living World;

Photosynthesis; In photosynthesis, producers use CO_2 and form organic compounds which become a part of them. When consumers feed on the producers, these organic

(Page 2/2) compounds become a part of them and eventually when producers and consumers die, producers feed on them.

Return of Carbon to the Environment;

Cellular Respiration; when producers and consumers (living ^{all} organisms) respire, CO_2 is added back into the environment.

Human Activities; certain human activities influence this cycle negatively. Combustion of fuel and deforestation have upset carbon balance in the atmosphere.

Microbial Activities; Microbial decay activities also add carbon (in the form of methane CH_4) in the environment.

Q. No. 4 Part (a)

Structure of the Eye;

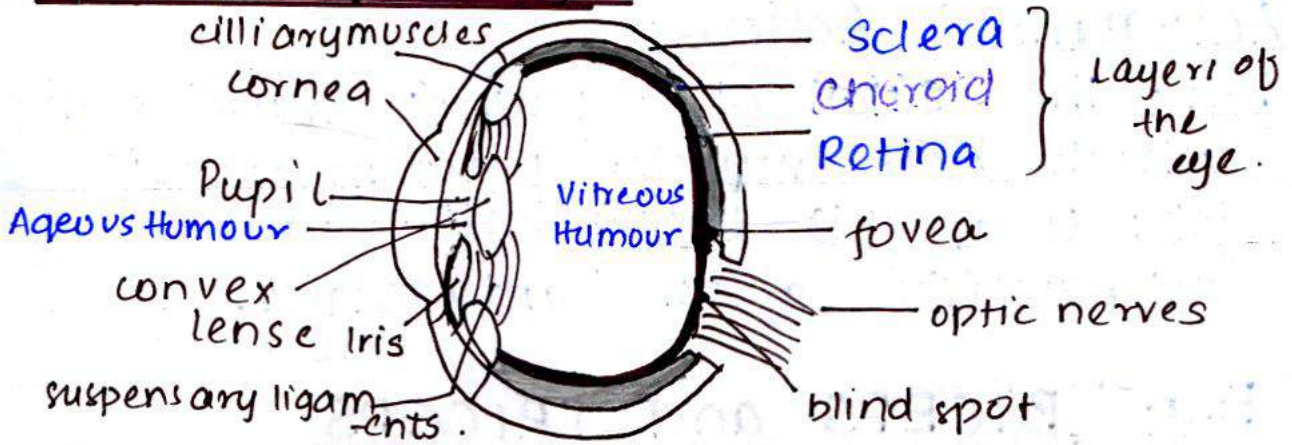
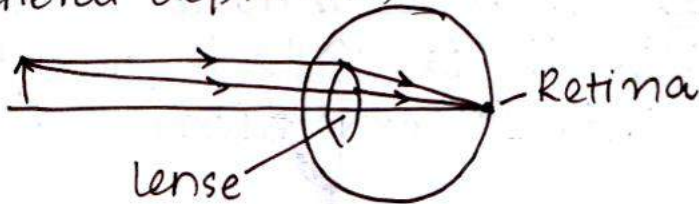


Image formation;

(general depiction)



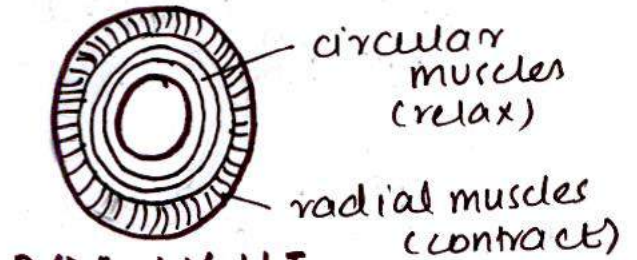
Dilation and constriction of Pupil;

CONSTRICTION



BRIGHT LIGHT

DILATION



DIM LIGHT

Q. No. 4 Part (a)

Structure of the Eye;

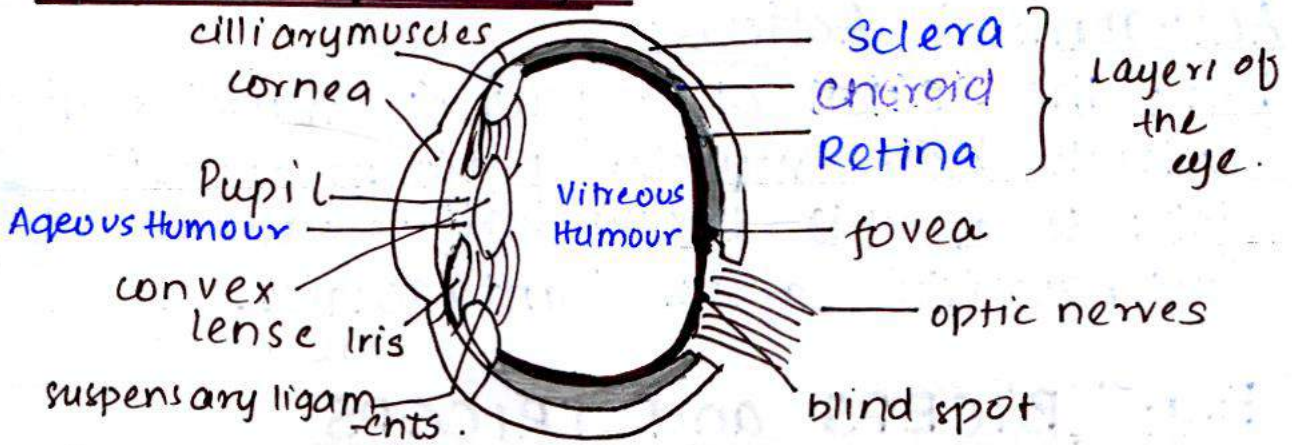
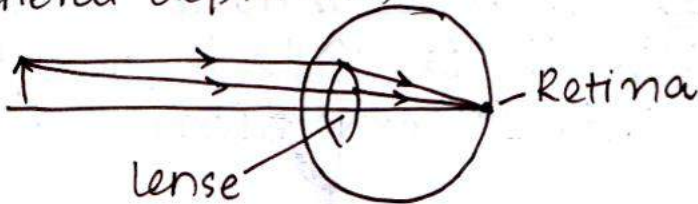


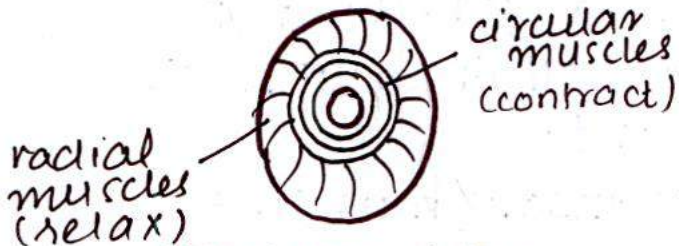
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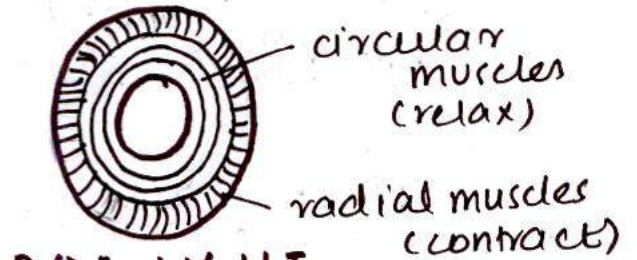
Dilation and constriction of Pupil;

CONSTRICION



BRIGHT LIGHT

DILATION



DIM LIGHT

Antagonism

Antagonistic Action;

Def: The action of a pair of muscles in which both muscles perform opposite jobs to enable movement is called antagonistic action / antagonism.

E.g; BICEPS and TRICEPS

BICEP

Flexor Muscle; When a muscle contracts to bend a joint, it is called an flexor muscle and this is flexion of the joint.

Bicep is an flexor muscle.

TRICEP

Extensor Muscle; When a muscle contracts to straighten a joint, it is an extensor muscle and this action is called extension of joint.

Tricep is an extensor muscle.

Position of Muscles;

1. Bicep is located on top of the upper arm bone (humerus).

2. Tricep is located behind the upper arm bone (humerus)

3. Both bones have their origin at pectoral girdle (shoulder) and their insertion at one of the two bone of

(Page 2/2) the forearm (radius, ulna).

Action;

Flexion of Elbow joint; When bicep contracts, forearm is pulled upward at the elbow joint. During this, tricep relaxes. Hence, bicep is an ~~ex~~ flexor muscle and this flexion about the elbow joint.

Extension of Elbow joint; when tricep contracts, forearm is pulled downwards about the elbow joint. During this, bicep relaxes. This is extension of elbow joint and hence tricep is an extensor muscle.

In this way, biceps and triceps function antagonistically in different parts of the body.

Female Reproductive System Rabbit

Parts of the Female Reproductive System;

The female reproductive system comprises of;

- 1- ovaries (a pair)
- 2- uterus horns
- 3- vagina (birth canal)
- 4- fallopian tubes.

1- Ovaries and the Fallopian Tube;

Rabbit (female) consists of a pair of ovaries in the lower abdomen, ventral to the kidney.

- 1- Oogenesis :- Egg cells are synthesized in the outer region of the ovaries.
- 2- Follicles :- There is a cluster of specialized cells called follicles which nourish the egg cells.

From the ovaries, egg cells are released into the fallopian tube. Its opening lies close to the ovaries. In the fallopian tube, fertilization occurs.

2- Uterus Horns;

From the fallopian tubes, a fertilized egg cell (zygote), moves to the uterus.

(Page 2/2) Uterus horns :- Uterus is divided into two parts called the uterus horns which unite to form vagina or the birth canal.

3-Cervix; cervix is the portion of the uterus which separates the uterus horns from the vagina/birth canal.

4-Uterus walls; There is a portion surrounding the uterus horns called the uterus walls. This is where the fertilized egg cells are implanted and a connection between egg cells and horns, called "placenta" is established.

Internal Fertilization with female reproductive tract;

1. Male sperms are deposited at vagina. They (male rabbits) can breed throughout the year but are sterile in summer.

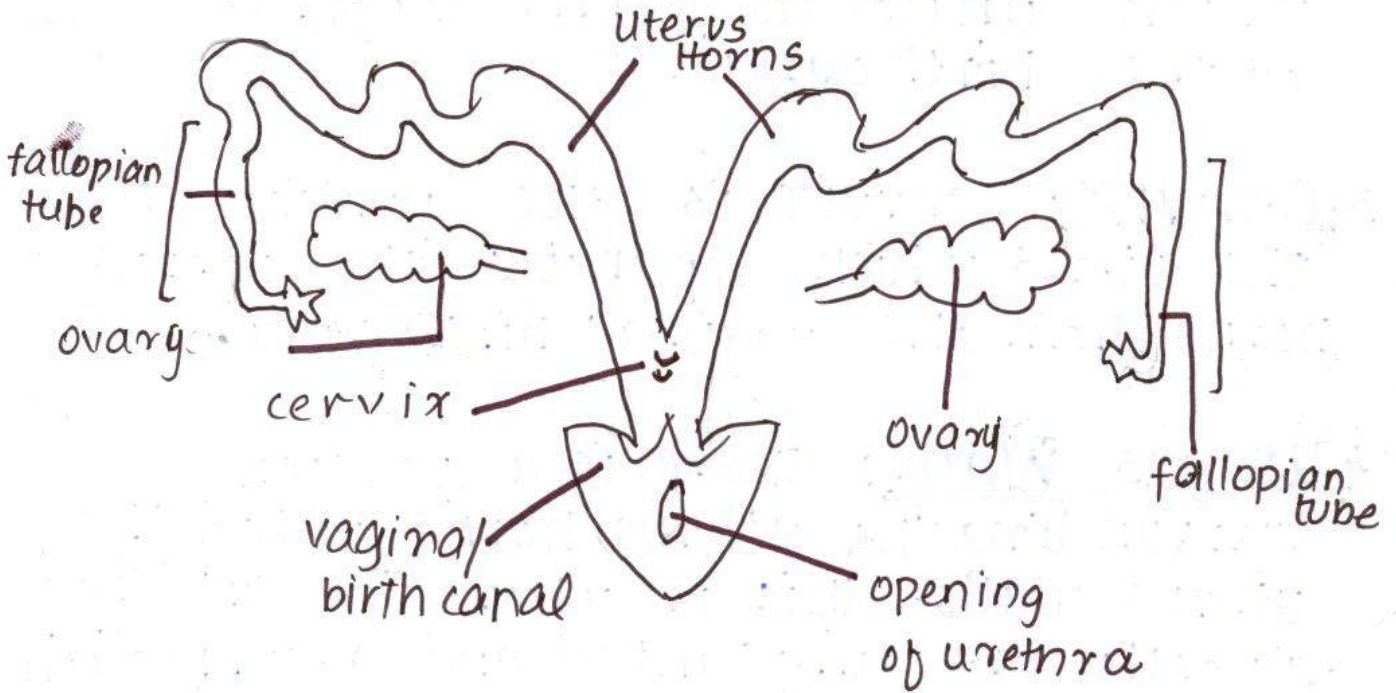
2- Sperms swim through cervix, uterus horns and in the fallopian tube.

3- In the fallopian tube, fertilization occurs. Next, the fertilized egg (zygote) moves through the uterus horns.

4- By now, it has started dividing and is called an embryo. It is implanted in the uterus walls. A connection "placenta" is established. After 30-32 days, it develops and is born.

Q. No. 5 Part (b)

Female Reproductive System



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Q. No. 5 Part (b)

Female Reproductive System

