

# ICSE Solved Paper 2019

## Biology

### Class-X

(Maximum Marks : 80)

(Time allowed : Two hours)

Answers to this Paper must be written on the paper provided separately.

You will **not** be allowed to write during the first 15 minutes.

This time is to be spent in reading the Question Paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Attempt **all** questions from **Section I** and **any four** questions from **Section II**.

The intended marks for questions or parts of questions are given in brackets [ ].

#### SECTION-I

(40 marks)

Attempt **all** questions from this Section

1. (a) Name the following: [5]

- (i) The layer of the eyeball that provides nourishment to the eye.
- (ii) One gaseous compound which depletes the ozone layer.
- (iii) The structure which connects the placenta and the foetus.
- (iv) A pair of corresponding chromosomes of the same shape and size and derived one from each parent.
- (v) The compound formed when haemoglobin combines with carbon dioxide in blood.

Ans.

- (i) Choroid
- (ii) CFCs (Chlorofluorocarbons)
- (iii) Umbilical cord
- (iv) Homologous chromosomes
- (v) Carbaminohaemoglobin

(b) Correct and rewrite the statements by changing the biological term that is underlined for each statement: [5]

- (i) The theory of Inheritance of Acquired Characters was proposed by Watson and Crick.
- (ii) The protective sac which develops around the developing embryo is called the Pericardium.
- (iii) Maintaining balance of the body and coordinating muscular activities is carried out by the cerebrum.
- (iv) The kidney is composed of number of neurons.
- (v) The part of the eye which can be donated from a clinically dead person is the Retina.

Ans. (i) The theory of Inheritance of Acquired Characters was proposed by **Lamarck**.

- (ii) The protective sac which develops around the developing embryo is called the **amniotic sac**.
- (iii) Maintaining balance of the body and co-ordinating muscular activities is carried out by the **cerebellum**.
- (iv) The kidney is composed of number of **nephrons**.
- (v) The part of the eye which can be donated from a clinically dead person is the **cornea**.

(c) Give suitable **biological reasons** for the following statements: [5]

- (i) The birth rate in India is very high.
- (ii) Carbon monoxide is dangerous when inhaled.
- (iii) Root hairs become flaccid and droop when excess fertilizers are added to the moist soil around them.
- (iv) Acid rain is harmful to the environment.
- (v) All life on Earth is supported by Photosynthesis.

Ans. (i) Reasons for the high birth rate in India are :

- (a) Advancement of medical science, so there is low infant mortality.
- (b) Better health care facilities during last 3-4 decades.
- (ii) Carbon monoxide has 210 times greater affinity for haemoglobin than oxygen due to which the carbon monoxide binds very strongly with haemoglobin and prevents it from carrying oxygen to the brain and other parts of the body. It causes carbon monoxide (CO) poisoning, headache, nausea, muscular weakness etc, which on higher level exposure is can be fatal.

- (iii) Fertilizer along with soil water acts as a hypertonic solution. This causes the water to move from the root hair cells to soil i.e., exosmosis. Hence, the root hair cell to become flaccid and droop.
- (iv) **Acid rain is harmful to the environment in ways as follows :**
  - (a) It causes death of aquatic animals due to rising acidity levels in water bodies.
  - (b) It causes leaching of essential minerals of soil and toxic mineral left will kill the plants.
- (v) Photosynthesis is the primary source of all food on earth. It is also responsible for the release of oxygen into the atmosphere by green plants. Thus, it can be said that photosynthesis is the basis of life on earth.
- (d) **Match the items given in Column A with the most appropriate ones in Column B and REWRITE the correct matching pairs: [5]**

| Column A            | Column B             |
|---------------------|----------------------|
| (i) Cranial nerves  | — Testosterone       |
| (ii) Leydig cells   | — Natural reflex     |
| (iii) Acetylcholine | — 12 pairs           |
| (iv) Spinal nerves  | — Prolactin          |
| (v) Sneezing        | — Neurotransmitter   |
|                     | — 18 pairs           |
|                     | — 31 pairs           |
|                     | — Conditioned reflex |

Ans.

(d)

| Column A            | Column B         |
|---------------------|------------------|
| (i) Cranial nerves  | 12 pairs         |
| (ii) Leydig cells   | Testosterone     |
| (iii) Acetylcholine | Neurotransmitter |
| (iv) Spinal nerves  | 31 pairs         |
| (v) Sneezing        | Natural reflex   |

- (e) **Choose the correct answer from the four options given below: [5]**
- (i) **While recording the pulse rate, where exactly does a doctor press on our wrist?**
  - (a) Nerve
  - (b) Vein
  - (c) Artery
  - (d) Capillary
- (ii) **In a human male, a sperm will contain:**
  - (a) Both X and Y chromosomes
  - (b) Only Y chromosome
  - (c) Only X chromosome
  - (d) Either X or Y chromosome
- (iii) **A muscular wall is absent in:**
  - (a) Capillary
  - (b) Venule
  - (c) Arteriole
  - (d) Vein
- (iv) **On which day of the menstrual cycle does**

**ovulation take place?**

- (a) 5<sup>th</sup> day
- (b) 28<sup>th</sup> day
- (c) 14<sup>th</sup> day
- (d) 1<sup>st</sup> day

(v) **Which one of the following does not affect the rate of transpiration?**

- (a) Light
- (b) Humidity
- (c) Wind
- (d) Age of the plant

Ans.

- (i) **Option (c) is correct.**
- (ii) **Option (a) is correct.**
- (iii) **Option (a) is correct.**
- (iv) **Option (c) is correct.**
- (v) **Option (d) is correct.**

(f) **Identify the ODD term in each set and name the CATEGORY to which the remaining three belong: [5]**

**Example:** glucose, starch, cellulose, calcium

Odd term: calcium

Category: others are different types of carbohydrates.

- (i) Addison's disease, Cushing's Syndrome, Acromegaly, Leukemia.
- (ii) Insulin, Adrenaline, Pepsin, Thyroxine.
- (iii) Axon, Dendron, Photon, Cyton.
- (iv) Chicken pox, Colour blindness, Haemophilia, Albinism.
- (v) Polythene bag, Crop residue, Animal waste, Decaying vegetable.

Ans. (f) (i) Odd term- Leukemia

Category- others are different types of hormonal disorders

(ii) Odd term- Pepsin

Category- others are hormones

(iii) Odd term- Photon

Category- others are parts of neuron

(iv) Odd term- Chicken pox

Category- others are genetic disorders

(v) Odd term- Polythene bag

Category- others are biodegradable wastes

(g) **Expand the following biological abbreviations: [5]**

(i) ABA

(ii) IAA

(iii) ATP

(iv) DNA

(v) TSH

Ans. (g) (i) ABA- Abscisic acid

(ii) IAA- Indole-3-acetic acid

(iii) ATP- Adenosine triphosphate

(iv) DNA- Deoxyribonucleic acid

(v) TSH- Thyroid Stimulating Hormone

(h) Study the picture given below and answer the following questions:

[5]



- (i) Identify the type of pollution.  
 (ii) Name one pollutant that causes the above pollution.  
 (iii) Mention the impact of this pollution on human health.  
 (iv) State one measure to control this pollution.  
 (v) What is a 'Pollutant'? Explain the term.
- (ii) Oil spills, sewage discharge (**Any one**)  
 (iii) Pollution of water may cause many water borne diseases such as dysentery, typhoid, cholera, jaundice, etc.  
 (iv) Proper sewage treatment and management.  
 (v) Pollutant is any constituent when added to environment/ air, water or land deteriorates its natural quality.

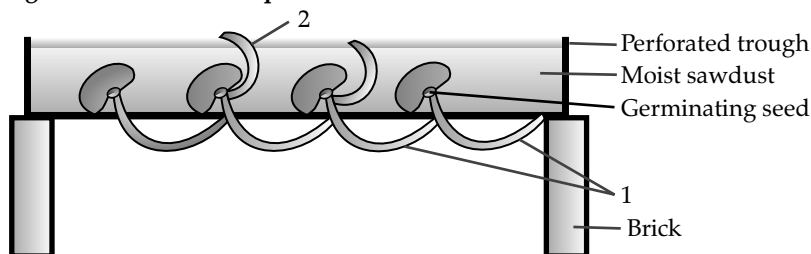
Ans. (h) (i) Water pollution

**SECTION-II**

**(40 marks)**

*Attempt any four questions from this Section.*

2. (a) Given below is an experimental setup to demonstrate a particular tropic movement in germinating seeds. Study the diagram and answer the questions that follow: [5]



- (i) Label the parts 1 and 2.  
 (ii) Name the tropic movement shown by part 1.  
 (iii) Part 1 is affected by two stimuli. Name them.  
 Which one of the two is stronger?  
 (iv) What is Thigmotropism? Give one example.  
 (v) What is meant by 'Positive' and 'Negative' tropic movements in plants?
- (iii) Radicle is affected by both gravity and water stimulus.  
 From the experiment it is observed that the growth of roots towards water overcomes the force of gravity. This suggests that roots are positively hydrotropic than geotropic. This implies that water is a more stronger stimulus than gravity.

- (b) Mention the exact location of the following: [5]

- (i) Testis  
 (ii) Incus  
 (iii) Thylakoids  
 (iv) Amniotic fluid  
 (v) Corpus callosum
- (iv) Thigmotropism is the movement due to contact with a foreign body. Tendrils, twinnings, petiole of *Clematis* show thigmotropic movements.  
 (v) If the movement is towards the direction of stimuli, it is known as positive tropism, if the movement is away from the stimuli, it is known as negative tropism.

[Any one example]

Ans. (a) (i) Part 1- Radicle

Part 2- Plumule

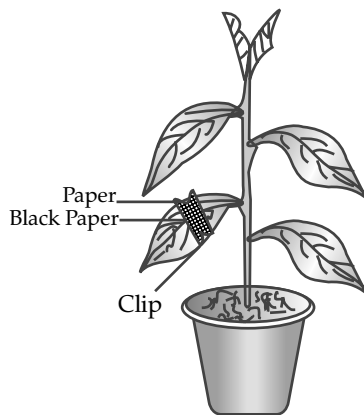
- (ii) Radicle shows positive hydrotropic and positive geotropic movement

(b)

- (i) Testis- The testes are situated outside the abdominal cavity within a pouch called scrotum.

- (ii) Incus- Found in middle ear between malleus and stapes.
- (iii) Thylakoids- Located in the stroma region of chloroplast.
- (iv) Amniotic fluid- Present in the space between amnion and foetus in the embryo.
- (v) Corpus callosum- located between two lobes of cerebrum called cerebral hemisphere.

3. (a) The diagram given below represents an experiment to prove the importance of a factor in photosynthesis. Answer the questions that follow:



- (i) Name the factor studied in this experiment.
- (ii) What will you observe in the experimental leaf after the starch test?
- (iii) Explain the process of Photosynthesis.
- (iv) Give a balanced chemical equation to represent the process of photosynthesis.
- (v) Draw a neat, labelled diagram of an experimental setup to show that oxygen is released during photosynthesis.

(b) State the main functions of the following: [5]

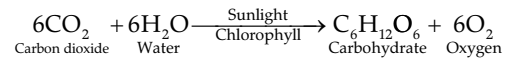
- (i) Medulla Oblongata
- (ii) Cytokinins
- (iii) Tears
- (iv) Coronary Artery
- (v) Seminal Vesicles

Ans. (a) (i) Sunlight is the factor being studied in the experiment.

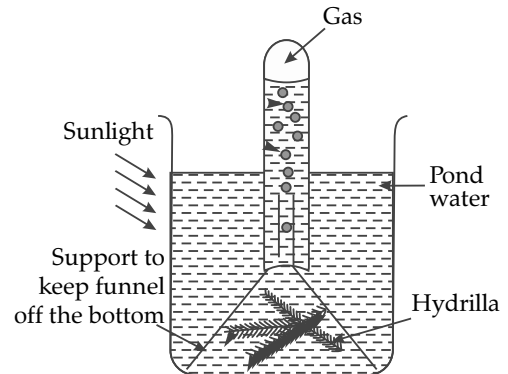
- (ii) On treating the leaf with iodine solution shows that portion of leaf covered with the strip of black paper does not give positive test for starch. The covered portion of leaf indicates the absence of starch after iodine test because it could not get light to perform photosynthesis hence, it is proved that in the absence of light the leaf cannot manufacture starch.

(iii) Photosynthesis is the process in which green plants or their parts produce complex carbon containing compounds with the help of inorganic raw materials such as CO<sub>2</sub> and water in the presence of sunlight. O<sub>2</sub> is liberated as the byproduct.

(iv)

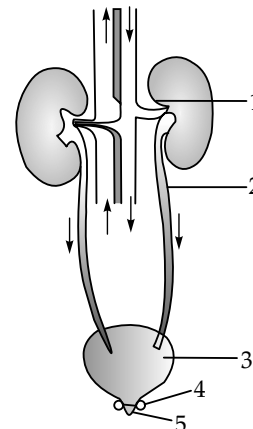


(v)



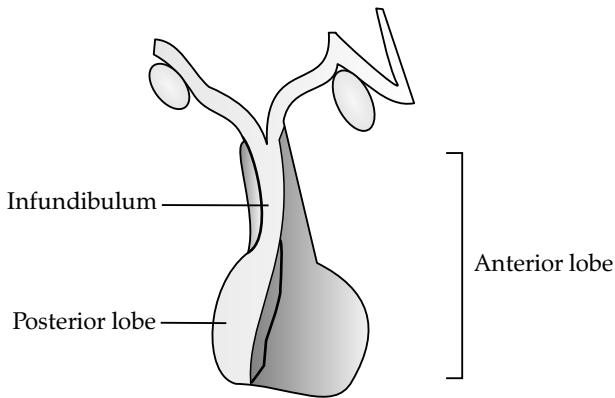
- (b) (i) **Medulla Oblongata:** helps regulate breathing, heart and blood vessel function, movement of alimentary canal, movements of lungs, movement of diaphragm, etc. This part of the brain is a center for respiration and circulation.
- (ii) **Cytokinins:** stimulates cell division and cell elongation, essential for morphogenesis or differentiation of tissues and organs, prevents ageing, promotes apical dominance, breaking of dormancy, initiation of interfascicular cambium.
- (iii) **Tears:** help in keeping front surface of the eye clean by washing away the dust particles.
- (iv) **Coronary artery:** supplies oxygenated blood to the walls of heart.
- (v) **Seminal vesicles:** secrete a viscous fluid which is alkaline in nature and serves as a medium for the transportation of the sperms. It contains fructose to provide energy for the swimming of sperm cells.

4. (a) The diagram given below represents an organ system in the human body. Study the same and answer the questions that follow:



- (i) Identify the system.

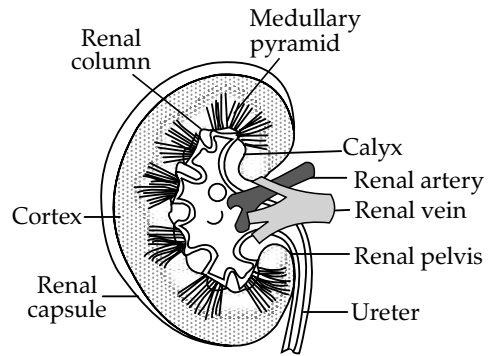
- (ii) Label the parts marked 2 and 4. Mention the function of part 5.
  - (iii) Name the structural and functional units of the part marked 1.
  - (iv) What is the fluid that accumulates in part 3? Which is the main nitrogenous waste present in it?
  - (v) Draw a neat, labelled diagram showing the longitudinal section of part 1.
- (b) The diagram given below represents an endocrine gland in the human body. [5]  
Study the diagram and answer the following questions:



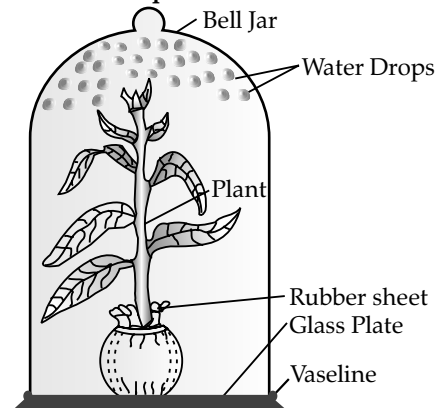
- (i) Identify the endocrine gland. Where is it located?
- (ii) Why is the above gland referred to as the 'Master gland'?
- (iii) Name the hormone which in deficiency causes Diabetes Insipidus. How does this disorder differ from Diabetes Mellitus?
- (iv) Explain the term 'Hormone'. What is the role of Tropic hormones in the human body?
- (v) Which lobe of the above gland secretes:
  1. Oxytocin
  2. ACTH
  3. Growth hormone

Ans.(a) (i) Excretory system.

- (ii) Part 2 - Ureter  
Part 4 - Urinary sphincter  
Part 5 - Urethra is a membranous tube through which urine emptied from bladder is conducted to the exterior.
- (iii) Part 1- Kidney  
Nephron is the structural and functional unit of kidney.
- (iv) Part 3 is the Urinary bladder.  
Urine is the fluid that is accumulated in the urinary bladder till a voluntary signal is given by the central nervous system (CNS). Urea is the main nitrogenous waste present in the urine of mammals.

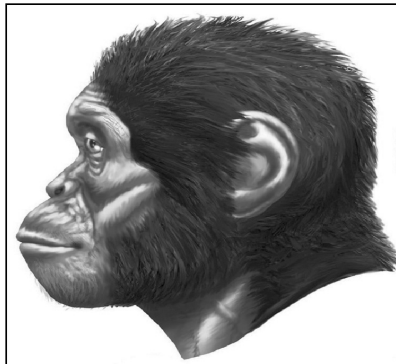


- (b) (i) Pituitary gland.  
It is located on the ventral side of diencephalon in a bony cavity called sella tursica and is attached to hypothalamus by a stalk called infundibulum.
  - (ii) Pituitary gland is considered as the master gland of endocrine system because it performs many functions besides the control of other endocrine glands.
  - (iii) Deficiency/Hyopsecretion of antidiuretic hormone (vasopressin) causes diabetes insipidus which results in loss of water through urine. Deficiency of insulin leads to diabetes mellitus.
  - (iv) The chemical substances produced by endocrine glands are termed as hormones. Tropic hormones, the secretion of other endocrine glands.
  - (v) 1. Posterior lobe of pituitary (Neurohypophysis) secretes oxytocin.  
2. Anterior lobe of pituitary secretes adrenocorticotrophic hormone (ACTH).  
3. Anterior lobe of pituitary secretes growth hormone (somatotropin).
5. (a) Given below is an apparatus which was setup to investigate a physiological process in plants. The setup was placed in bright sunlight. Answer the questions that follow:



- (i) Name the process being studied. Define the process.
- (ii) Why was the pot enclosed in a rubber sheet?
- (iii) Mention two external factors which can accelerate the above process.

- (iv) List two adaptations in plants to reduce the above process.  
 (v) Draw a neat, labelled diagram of a stomatal apparatus.  
 (b) Given below are two stages in the evolution of man. Study them and answer the questions that follow: [5]

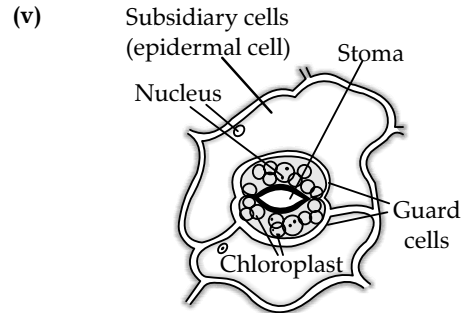


- (i) Identify *Australopithecus* and *Neanderthal* man from the above pictures.  
 (ii) Mention two characteristic features each for the two stages.  
 (iii) Who proposed the theory of 'Natural Selection'?  
 (iv) Name the organism used as an example to explain 'Industrial Melanism'.  
 (v) Give two examples of Vestigial organs in humans.

Ans. (a) (i) Transpiration.

It is the loss of the water as water vapours from the aerial parts/stem, leaves of the plant.

- (ii) To prevent evaporation of water from the soil.  
 (iii) Light and temperature can accelerate the process of transpiration.  
 (iv) **Adaptation in plants to reduce transpiration are :**  
 (a) Sunken stomata.  
 (b) Stomata covered by hair.  
 (c) Fewer stomata.  
 (d) Narrow leaves.  
 (e) Rolled or folded leaves.  
 (f) Leaves absent or modified into spines.  
 (g) Thick cuticle on leaves. [Any two]



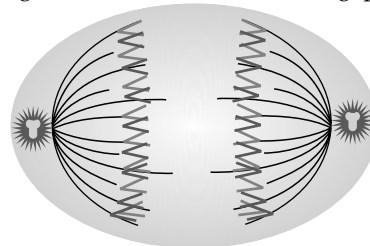
**Stomatal apparatus**

- (b) (i) A - *Neanderthal* man  
 B - *Australopithecus*  
 (ii) **Characters for *Australopithecus* :**  
 (a) Cranial capacity of 450 - 600 cm<sup>3</sup>  
 (b) Vertebral column has a distinct lumbar curve with a broad pelvis.  
**Characters for *Neanderthal* man :**  
 (a) Cranial capacity was about 1450 cm<sup>3</sup>  
 (b) Absolute bipedalism, large head and prominent brow ridges.  
 (iii) Charles Darwin proposed the theory of Natural Selection  
 (iv) Industrial Melanism was worked out by Fisher Ford and Kettlewell on peppered moth : *Biston betularia*.  
 (v) The muscles of pinna, vermiform appendix and wisdom teeth in man are the examples of vestigial organs.

6. (a) **In Mendel's experiments, tall pea plants (T) are dominant over dwarf pea plants (t).** [5]

- (i) What is the phenotype and genotype of the F<sub>1</sub> generation if a homozygous tall plant is crossed with a homozygous dwarf plant?  
 (ii) Draw a Punnett square board to show the gametes and offspring when both the parents are heterozygous for tallness.  
 (iii) What is the phenotypic ratio and genotypic ratio of the above cross in (ii)?  
 (iv) State Mendel's Law of Dominance.  
 (v) What is a Dihybrid Cross?

(b) Given below is a diagram representing a stage during the mitotic cell division. Study the diagram and answer the following questions: [5]



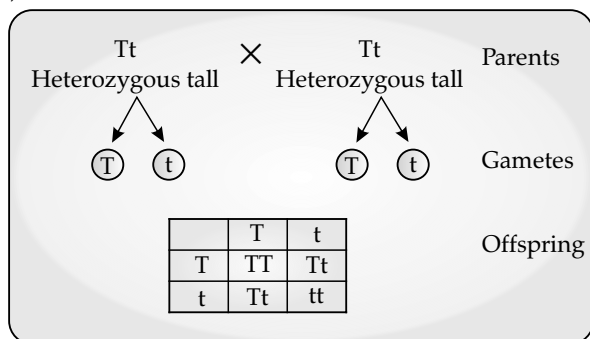
- (i) Identify the stage by giving a suitable reason.  
 (ii) Is it a plant or an animal cell? Give a reason to support your answer.  
 (iii) Draw a neat, labelled diagram of the stage which follows the one shown in the diagram.

(iv) How many chromosomes will each daughter cell have after the completion of the above division?

(v) Name the four nitrogenous bases.

**Ans. (a) (i)** When a homozygous tall plant (TT) is crossed with homozygous dwarf plant (tt), the F<sub>1</sub> progeny produced has genotype : Tt and the phenotype : tall.

(ii)



(iii) Phenotypic ratio – tall : dwarf-2:1

Genotypic ratio- TT : Tt : tt i.e., 1 : 2 : 1

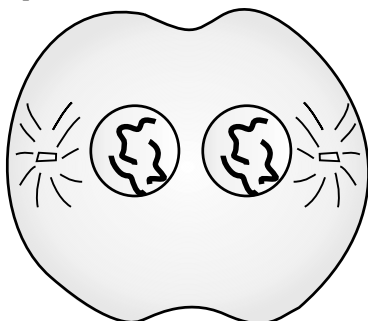
(iv) Mendel's Law of Dominance states that in a hybrid where both the contrasting alleles or unit factors are present, only one unit factor / allele called dominant is able to express itself while the other factor / allele called recessive remains suppressed.

(v) Dihybrid Cross is inheritance of two pairs of contrasting characters. For example, the inheritance of yellow and round seed character and the green wrinkled character is a dihybrid cross.

(b) (i) Anaphase

(ii) It is an animal cell. It shows presence of centriole and aster formation.

(iii) The stage that just comes after anaphase is telophase.



**In animal cell**

(iv) Since it is a mitotic division the each daughter cell will have same chromosome number as the parent cell.

(v) Adenine, Guanine, Thymine, Cytosine.

7. (a) **Answer the following questions briefly:** [5]

(i) How are the cytons and axons placed in the brain and the spinal cord?

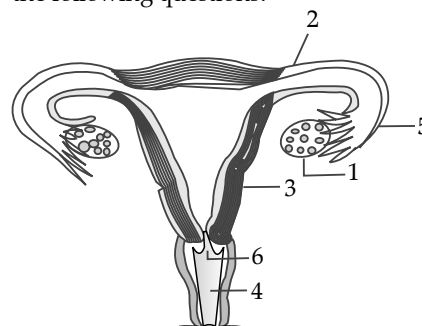
(ii) Which part of the human ear gives 'Dynamic balance' and 'Static balance' to the body?

(iii) Explain how the human eye adapts itself to bright light and dim light.

(iv) What is Parthenocarpy? Give one example.

(v) Mention any two objectives of 'Swachh Bharat Abhiyan'.

(b) The diagram given below represents a system in the human body. Study the diagram and answer the following questions: [5]



(i) Identify the system.

(ii) Label the parts marked 5 and 6.

(iii) Name the two hormones secreted by 1.

(iv) Mention the number and the name of the part involved in fertilization and implantation from the above diagram.

(v) Mention the surgical methods of contraception in:

1. Human males.
2. Human females.

**Ans.(a) (i)** In brain, cytons are found outside and axons are found inside whereas the spinal cord shows reverse of this : axons on the outside and cytons on the inside.

(ii) Inner ear. For static balance – Utriculus and sacculus

For dynamic balance – Semicircular canals

(iii) Retina has two types of photoreceptor cells, namely, rods and cones. Rods contain rhodopsin and distinguish the intensity of light. These are functional in dim light for night vision.

Cones contain iodopsin and are responsible for colour distinction. These are functional in day light.

(iv) Parthenocarpy is the development of a fruit without prior fertilization. Varieties of the pineapple, banana, cucumber, grape, orange, grapefruit, persimmon, and breadfruit exemplify naturally occurring parthenocarpy. [Any one example]

(v) **Two main objectives of 'Swachh Bharat Abhiyan' are :**

- (i) To eradicate the system of open defecation in India.
- (ii) To make people aware of healthy sanitation practices by bringing behavioural changes in people.

- (b) (i) Female reproductive system.  
(ii) Part 5- Infundibulum  
Part 6- Cervix  
(iii) Part 1- Ovary. It secretes two hormones- progesterone and estrogen.
- (iv) Part 2- Fallopian tube. Fertilization takes place in a fallopian tube.  
Part 3- Uterus. Implantation takes place in uterus.
- (v) 1. Vasectomy  
2. Tubectomy

