ICSE 2025 EXAMINATION

Sample Question Paper - 11

BIOLOGY

Time: 2 hrs. **Total Marks: 80**

General Instructions:

1. *Answers to this paper must be written on the paper provided separately*
2. *You will be not allowed to write during first 15 minutes*
3. *This time is to be spent in reading the question paper.*
4. *The time given at the head of this paper is the time allowed for writing the answers.*

Section A** is compulsory. Attempt any **four questions** from **Section B.

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

SECTION A

(Attempt all questions from this Section.)

Question 1

Choose the correct answers to the questions from the given options.

(Do not copy the question, write the correct answer only.) **[15]**

(i) **Assertion (A):** The right ventricle has thicker walls than the left ventricle.
Reason (R): The right ventricle pumps blood to the lungs for oxygenation.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ii) Kartik suffers from a condition 'A' due to which he has a difficulty in seeing things in dim light. He consulted an ophthalmologist who informed that this condition was due to the non-formation of a pigment 'B'. Identify 'A' and 'B' in this situation.

1. A – Colour blindness; B - Rhodopsin
2. A – Night blindness; B - Rhodopsin
3. A – Colour blindness; B - Iodopsin
4. A – Night blindness; B – Iodopsin

(iii) Spraying leaves with phenyl mercuric acetate causes

1. Increased photosynthesis
2. Decreased photosynthesis
3. Increased transpiration
4. Decreased transpiration

(iv) The stage of cell division during which the nuclear membrane and the nucleolus reappear is

1. Anaphase
2. Metaphase
3. Prophase
4. Telophase

(v) **Assertion (A):** Suppression of growth of lateral buds by apical buds is called apical dominance.
Reason (R): Cytokinins promote apical dominance.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(vi) Harish and his wife were expecting their second child. However, prenatal screening tests provided definite evidence of a serious genetic disease in the embryo. Therefore, they decided to abort their child. Which of the following methods must be chosen by the couple for the above purpose?

1. Vasectomy
2. Copper-T
3. MTP
4. Tubectomy

(vii) Increase in the concentration of certain non-biodegradable substances in higher trophic levels of the food chain is called

1. Eutrophication
2. Biomagnification
3. Environmental degradation
4. Biodiversity loss

(viii) **Assertion (A):** The cortex of a kidney tubule shows a 'dotted' appearance.
Reason (R): Henle's loop and collecting ducts lie in the cortex.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ix) Organ of Corti is present in the

1. Utriculus
2. Sacculus
3. Cochlea
4. Incus

(x) The _____ represents the transition between the Neanderthal man and the modern man.

1. *Homo habilis*
2. *Australopithecus*
3. *Cro-Magnon* man
4. *Homo erectus*

(xi) **Assertion (A):** Cowper's glands are two, small, ovoid glands which open into the urethra just before it enters the penis.
Reason (R): They pour an alkaline secretion into the semen which neutralises the acid in the female's vagina.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(xii) Which one of the following pairs is not matched correctly?

1. Cerebrum - Memory
2. Cerebellum – Body balance
3. Medulla oblongata - Controls activities of internal organs
4. Pons – Consciousness

(xiii) Distribution of stomata per unit area of the leaf and their size affect the rate of

1. Respiration
2. Transpiration
3. Guttation
4. Absorption

(xiv) Which of the following processes needs the involvement of energy?

1. Diffusion
2. Osmosis
3. Passive transport
4. Active transport

(xv) If a pure tall pea plant is crossed with a pure dwarf pea plant, what percentage of F_1 and F_2 generation respectively will be tall?

1. 25%, 25%
2. 50%, 50%
3. 75%, 100%
4. 100%, 75%

Question 2

(i) Name the following: **[5]**

(a) The iron-containing pigment in erythrocytes.
(b) The structure which carries urine from the kidney to the urinary bladder.
(c) A plant with variegated leaves.
(d) The difference between the birth rate and the death rate of a population.
(e) The fully developed part of the ovary containing the mature egg.

(ii) Given below are sets of five terms each. Without changing the first term, rearrange the remaining four so as to be in a logical sequence according to the directions given in brackets for each. One has been done for you as an example. **[5]**

Example: Pathogen, active immunity, produces antibodies, lymphocytes, antigen (defence mechanism of the body)
Answer: Pathogen → antigen → lymphocytes → produces antibodies → active immunity

(a) Destarched plant, iodine added, washed in water, a leaf boiled in alcohol, placed in sunlight
(Testing for the presence of starch)
(b) Left ventricle, pulmonary vein, mitral valve, left auricle, aorta
(Path of blood flow in the circulatory system)
(c) Seminiferous tubule, penis, urethra, epididymis, vas deferens
(Course of passage of sperms in males)
(d) Pinna, cochlea, tympanum, ear ossicles, auditory canal
(Route through which vibrations of sound enter the ear)
(e) Soil water, xylem, cortex, endodermis, root hair
(Conduction of water)

(iii) State whether the following statements are True or False. Correct and rewrite the false statements. **[5]**

(a) The laws of heredity were proposed by Morgan.
(b) Abscisic acid is the only hormone which is a gas at ordinary temperature.
(c) Cells which have lost their water content are said to be deplasmolysed.
(d) Cones enable us to see three primary colours.
(e) Production of food rises by arithmetic progression while population grows by geometrical progression.

(iv) Complete the following paragraph by selecting the correct words from those given in the brackets. **[5]**

(Stomata, Less, Hydrostatic, Hydathodes, More, Guttation, Transpiration)
In some plants, droplets of water appear along the margin. This water comes out through special pores called _____, and the process of escape of water is known as _____. This process is due to increased _____ pressure and _____ activity of a process called _____.

(v) Give the function of the following. **[5]**

(a) Prostate gland

(b) Placenta

(c) Pacemaker

(d) Corpus callosum

(e) Fovea centralis

SECTION B

(Attempt any four questions from this section.)

Question 3

(i) What is cytokinesis? [1]

(ii) A certain couple got four daughters in a sequence and no son. Does it mean that the husband does not produce Y chromosome bearing sperms? Explain. What is the chance of this couple having another daughter? [2]

(iii) How is the movement in plants different from that in animals? [2]

(iv) Why is respiration said to be a reverse process of photosynthesis? [2]

(v) Write any two functions of lymph. [3]

Question 4

(i) Why is urine yellow in colour? [1]

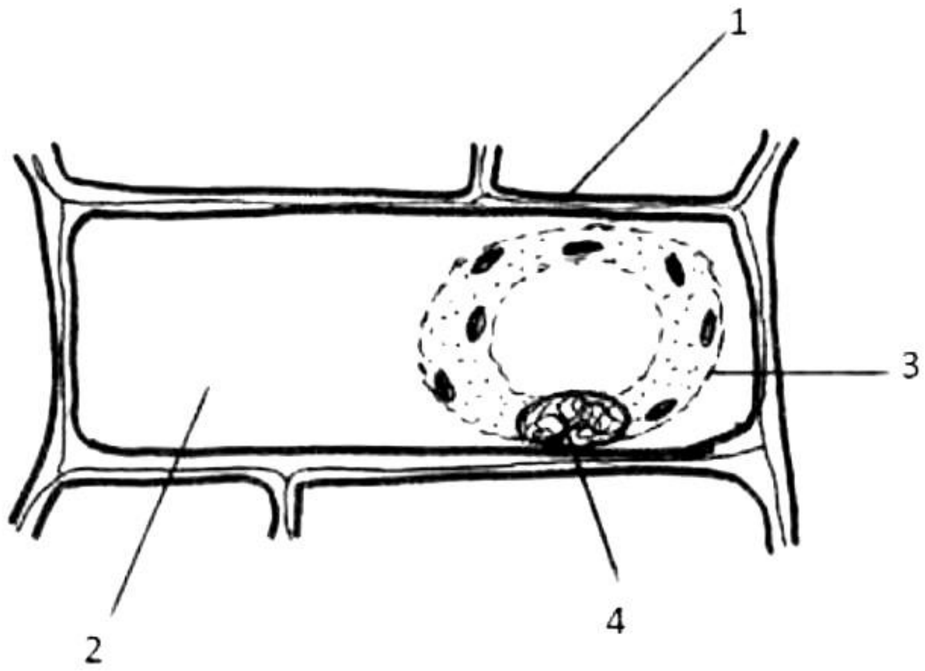
(ii) State the location and function of the yellow spot. [2]

(iii) Draw a diagram of a single Malpighian corpuscle and label the following parts: Glomerulus, Bowman's capsule, Afferent arteriole, and Efferent arteriole. [2]

(iv) Which part of the ear is responsible for - [2]

1. Static equilibrium
2. Dynamic equilibrium

(v) The diagram given below represents a plant cell after being placed in a strong sugar solution. Study the diagram and answer the questions that follow: [3]



(a) What is the state of the cell shown in the diagram?
(b) Label the parts 1 – 4 in the diagram.
(c) How can the above cell be brought back to its original condition? Mention the scientific term for the recovery of the cell.

Question 5

(i) Wilted lettuce leaves become crisp or firm when placed in cold water for a while. [1]
(ii) Discuss the impact of air pollution. [2]
(iii) What is meant by 'population density'? By which method are women surgically operated to prevent the flow of eggs into the oviduct? [2]
(iv) State the function of the sensory neuron and the motor neuron. [2]
(v) The circulatory system of the foetus and that of the mother are never connected directly. How is this advantageous? [3]

Question 6

(i) Define mutation. [1]
(ii) Is it correct to say that the testes produce testosterone? Discuss. [2]
(iii) Explain why transpiration and photosynthesis are interlinked during the day. [2]
(iv) Give reason: People living in the hilly regions usually suffer from simple goitre. [2]
(v) The below diagram represents the vertical view of the human female reproductive system. [3]

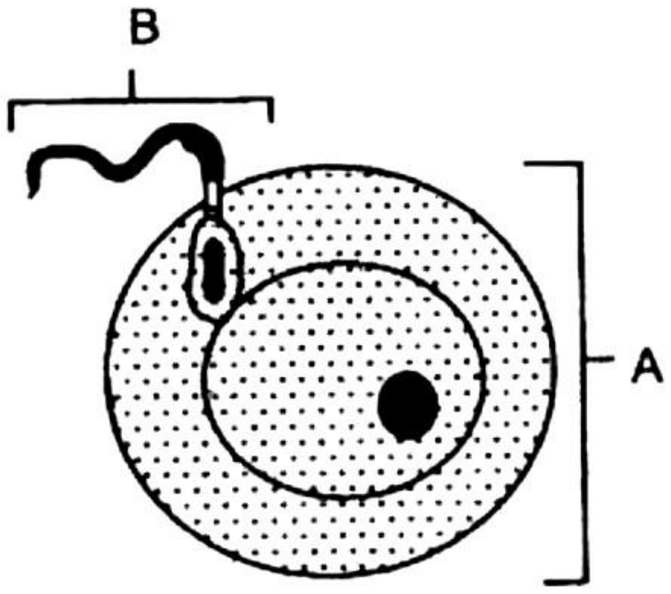
a) Label the parts indicated by the guidelines 1 to 8.
b) How does the uterus prepare for the reception of the zygote?
c) What happens to the uterus if fertilisation takes place?

Question 7

(i) What is the importance of meiosis? [1]
(ii) What is crossing-over? What are the factors affecting it? [2]
(iii) How is Lamarck's Theory different from Darwin's Theory of Evolution? [2]
(iv) Why injury to the medulla oblongata results in death? [2]
(v) Our resources cannot keep pace with the ever-increasing population. Give three examples in support of this statement. [3]

Question 8

(i) Which tissues and cells are mainly concerned with photosynthesis? [1]
(ii) Give reason: Leaves of some plants wilt during midday and recover in the evening. [2]
(iii) What is blood pressure? How is it measured? [2]
(iv) Write two characteristic features of the *Cro-Magnon* man. [2]
(v) The diagram below represents two reproductive cells A and B. Study the same and then answer the questions that follow [3]



a) Identify the reproductive cells A and B.
b) Name the specific part of the reproductive system where the above cells are produced.
c) Where in the female reproductive system do these cells unite?

Solution

SECTION A

Solution 1

(i) A is false and R is true

(ii) A - Night blindness; B - Rhodopsin

(iii) Decreased transpiration

(iv) Telophase

(v) A is true and R is false

(vi) MTP

(vii) Biomagnification

(viii) A is true and R is false

(ix) Cochlea

(x) *Cro-Magnon* man

(xi) A is true and R is false

(xii) Pons - Consciousness

(xiii) Transpiration

(xiv) Active transport

(xv) 100%, 75%

Solution 2

(i)

(a) Haemoglobin

(b) Ureter

(c) Coleus/Geranium/Croton *(Any one)*

(d) Growth rate

(e) Graafian follicle

(ii)

(a) Destarched plant → placed in sunlight → a leaf boiled in alcohol → washed in water → iodine added

(b) Pulmonary vein → left auricle → mitral valve → left ventricle → aorta

(c) Seminiferous tubule → epididymis → vas deferens → urethra → penis

(d) Pinna → auditory canal → tympanum → ear ossicles → cochlea

(e) Soil water → root hair → cortex → endodermis → xylem

(iii)

(a) False. The laws of heredity were proposed by Mendel.
(b) False. Ethylene is the only hormone which is a gas at ordinary temperature.
(c) False. Cells which have lost their water content are said to be plasmolysed.
(d) True.
(e) True.

(iv)

In some plants, droplets of water appear along the margin. This water comes out through special pores called **hydathodes**, and the process of escape of water is known as **guttation**. This process is due to increased **hydrostatic** pressure and **less** activity of a process called **transpiration**.

(v)

(a) Prostate gland: Secretes an alkaline secretion into the semen which neutralises the acid in the female's vagina.
(b) Placenta: Provides nutrients and oxygen and offers protection to the foetus. It also acts as an endocrine gland and produces oestrogen and progesterone.
(c) Pacemaker: Sino-atrial (SA) node; a node of cardiac muscles which initiates the heartbeat and transmits it further.
(d) Corpus callosum: Connects the two cerebral hemispheres of the brain and transfers information from one hemisphere to the other hemisphere.
(e) Fovea centralis: Serves as the region of brightest vision and of colour vision.

SECTION B

Solution 3

(i) Cytokinesis is the process of division of the cytoplasm in which the entire cell splits separating each nucleus.

(ii) If a sperm containing the Y chromosome fertilises the egg which always carries the X chromosome, then the zygote develops into a male. If a sperm containing the X chromosome fertilises the egg, then the zygote develops into a female.

The couple got four daughters as a matter of chance wherein every time the X-chromosome carrying sperm fertilised the egg. This does not imply that the husband does not produce Y chromosome bearing sperms. Getting a daughter or a son is a matter of chance. The chance of the couple getting another daughter is again 50% and so is for the son.

(iii) Differences between movement in plants and movement in animals: *(Any two points)*

Movement in plants	Movement in animals
1. It involves bending, twisting and elongation of plant parts.	1. It involves displacement of the body from one place to another.
2. Plants generally move to secure support, capture food or to find water or soil nutrients.	2. Animals generally move to find mates, for protection from environmental changes and to capture food.
3. Plant movements are confined to only some plant parts.	3. Animal movements involve the movement of the entire body.
4. Plant movements are often related to growth.	4. Animal movements are not related to growth.
5. No muscles are involved in plant movements.	5. Muscles are involved in animal movements.

(iv) Respiration said to be a reverse process of photosynthesis because of the following reasons:

- In respiration, energy is released because of oxidation of food, whereas in photosynthesis, energy is stored in a carbohydrate molecule.
- Oxygen is used during respiration whereas oxygen is released as a by-product during photosynthesis.
- In respiration, carbon dioxide is released whereas in photosynthesis carbon dioxide is consumed.

Due to these contrasting characteristics, respiration is said to be a reverse process of photosynthesis.

(v) Functions of lymph: *(Any two)*

1. Absorbs fats from the intestines
2. Drains excess tissue fluid into the blood
3. Protects the body from disease-causing germs

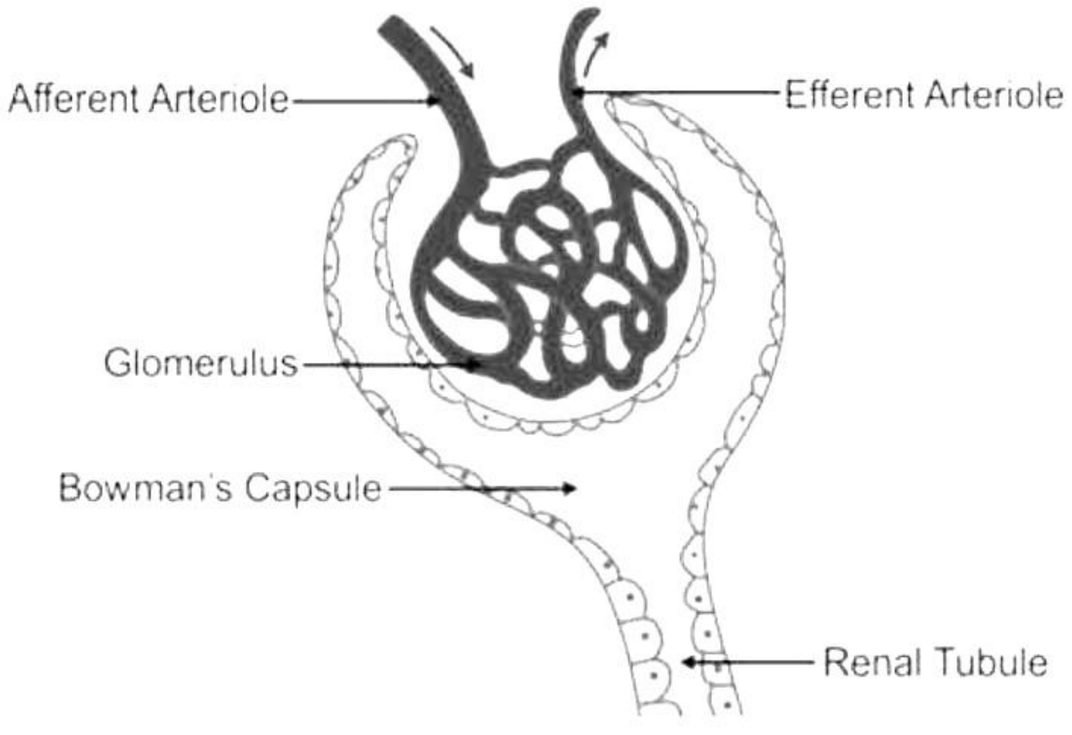
Solution 4

(i) Urine is yellow in colour due to the presence of a pigment urochrome, formed due to the breakdown of haemoglobin of old RBCs.

(ii) Location and function of yellow spot:

	Location	Function
Yellow spot	Back of the eye, at the centre of the horizontal axis of the eyeball	It contains the maximum number of sensory cells and is the region of brightest vision and colour vision.

(iii) Malpighian corpuscle:



(iv)

1. Static equilibrium: Sacculus and utriculus
2. Dynamic equilibrium: Semicircular canal

(v)

(a) The cell is in plasmolysed or flaccid state.

(b) 1 → Cell wall
2 → Strong sugar solution
3 → Cell membrane
4 → Nucleus

(c) If the cell is placed in a hypotonic solution (water), the cell can be brought to its original condition. The scientific term for the recovery of the cell is deplasmolysis.

Solution 5

(i) Wilted lettuce leaves have a hypertonic cell sap. When they are placed in cold water, endosmosis occurs. Water enters the cells of the lettuce leaves and the plasmolysed cells become turgid. Therefore, the wilted lettuce leaves become crisp or firm when placed in cold water for a while.

(ii) Besides global warming and climate change, air pollution also has adverse effects on the environment. Depletion of the ozone layer intensifies ultraviolet (UV) radiation. Intensified radiation causes a significant increase in the incidences of skin cancer and eventually have lethal effects on several organisms, including man. In plants, enhanced levels of UV radiation are feared to cause stunted growth, short, thick stems, and smaller leaves.

(iii) Population density is the number of individuals per square kilometre (km^2)at any given time. Women are surgically operated to prevent the flow of eggs into the oviduct by the method of tubectomy.

(iv) Sensory neuron: It carries impulses from the receptor to the brain or the spinal cord.
Motor neuron: It carries impulses from the brain or the spinal cord to the effector.

(v) A separate circulatory system for the mother and the foetus facilitates quick diffusion of nutrients, metabolic wastes and respiratory gases between the foetus and the mother. Bacteria and other pathogens cannot pass from the mother to the foetus because they are filtered out by the placenta. Blood pressure changes in the maternal circulation also cannot affect the foetus which has delicate blood vessels.

Solution 6

(i) Mutation is a sudden change in one or more genes, or in the number or in the structure of chromosomes brought about by internal or external factors.

(ii) Testosterone is the male reproductive hormone produced by the interstitial cells or the Leydig cells. These cells are present in the testes. They serve as a packing tissue between the coils of the seminiferous tubules. Therefore, it can be said that the testes produce the male sex hormone testosterone.

(iii) During the day, the chloroplast in the guard cells may carry out photosynthesis, therefore the osmotic pressure in the guard cells' cell sap is high, and water enters the guard cells, causing the stomatal aperture to open. As a result, stomatal transpiration can occur, and CO_2 can enter the green leaf, allowing photosynthesis to occur. As a result, photosynthesis and stomatal transpiration occur concurrently during the day.

(iv) Goitre is a disease caused due to the deficiency of iodine in the diet. We get iodine from salts. Hilly regions are far away from the seacoast; hence the iodine content of the soil is negligible. As a result, the food grown in such soil also becomes iodine deficient. When people living in the hilly regions consume iodine deficient food, they do not get adequate iodine. When there is a dietary iodine deficiency, the thyroid gland enlarges to make up for the deficiency, which causes goitre.

(v)

a) 1 - Oviduct
2 - Funnel of oviduct
3 – Ureter
4 – Vagina
5 – Ovary
6 – Uterus
7 – Bladder
8 – Urethra

b) The endometrium lining and glands of the uterine wall grow to prepare for the reception of the zygote.

c) If fertilisation takes place, the embryo is implanted in the uterus. The uterine wall develops a placenta which attaches the embryo to the uterus and the uterine wall expands to accommodate the growing embryo.

Solution 7

(i) Meiosis is important to maintain a constant number of chromosomes in a species. It also brings about variations which result in the evolution or origin of new species.

(ii) Crossing-over is the process of exchange of genetic material during meiosis between two non-sister chromatids of a pair of homologous chromosomes.
High temperature, X-rays and radiation treatment are the factors affecting the process of crossing-over.

(iii) Differences between Lamarck's Theory and Darwin's Theory of Evolution: *(Any two)*

Lamarck's Theory	Darwin's Theory
1. Known as the theory of inheritance of acquired characters.	1. Known as the theory of natural selection.
2. Believes in the use and disuse of an organ. Parts used or changes acquired get transmitted to the next generation.	2. Believes that since variations exist in individuals, only the fittest survive in the struggle for existence.
3. New species evolve after a long period of time after several generations by acquiring new characters.	3. New species evolve due to accumulation of favourable variations over a long period of time.

(iv) Medulla oblongata controls the involuntary functions of the body such as heartbeat, rate of respiration, secretion of saliva, gut peristalsis, etc. Injury to the medulla oblongata may disrupt or halt these essential life activities and may result in death.

(v) Below examples support the fact that our resources cannot keep pace with the ever-increasing population:

1. As population growth follows geometric progression while increase in food production is in arithmetic progression, there is a lack of food as the population of the world increases.
2. To accommodate the growing population, there is a subsequent lack of housing facilities, recreational facilities, clinics, and hospitals.
3. There is unemployment due to population growth and restricted land available for factories and other businesses.

Solution 8

(i) The tissues and cells, mainly the palisade parenchyma and spongy mesophyll cells of a green leaf which contain chloroplasts are concerned with photosynthesis.

(ii) Despite plenty of water in the soil, the leaves of some plants such as balsam wilt during the midday. It is because the rate of transpiration during midday exceeds the rate of water absorption by the roots. As a result, the cells lose turgidity. In the evening, the stomata are constricted, and the temperature is not high. Therefore, there is no loss of water through transpiration and the turgidity of the leaves is regained. The plants thus recover and stand out erect.

(iii) The blood flowing through the arteries exerts some pressure on their walls. This pressure is known as blood pressure. It is measured by an instrument called sphygmomanometer.

(iv) Characteristic features of the *Cro-Magnon* man: *(Any two points)*

1. Their cranial capacity was about 1450 to 1600 cm^3.
2. They had a large skull, broad face, rounded forehead, and a prominent chin.
3. They lacked eyebrow ridges.
4. Their body was less hairy.

(v)

a) A – Ovum
   B – Sperm

b) Ovum (A) is produced in the ovary, whereas the sperm (B) is produced in the testes.

c) These cells unite in the oviduct (fallopian tube).