# ICSE 2025 EXAMINATION

## Sample Question Paper - 17

## BIOLOGY

**Time: 2 hours** **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):** Plastic bags, metal cans, and styrofoam are biodegradable wastes.
**Reason (R):** Biodegradable wastes cannot be broken down by microorganisms.

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) Which hormone is secreted by the Leydig cells?

1. Oestrogen
2. Testosterone
3. Oxytocin
4. Pitocin

(iii) Priti went to the market with her mother where she saw big sized-apples and elongated grapes. Her mother told her that such large-sized fruits can be grown under the influence of a plant hormone. Which hormone is Priti's mother referring to?

1. Auxin
2. Cytokinin
3. Ethylene
4. Gibberellin

(iv) Ratna placed a Rheo leaf in boiling water first and then added a drop of sugar syrup to it. What will be her observation?

1. The cells will swell first and then shrink.
2. The cells will shrink first and then swell.
3. The cells will be dead due to boiling.
4. The cells will not show any change first but will swell later.

(v) **Assertion (A):** The normal pH of urine is 6.
**Reason (R):** Protein diet makes the urine more alkaline while vegetable diet makes it more acidic.

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) We cannot make out the red, violet, or purple colour of the flowers in a garden on a moonlit night because the

1. Rod cells are functional
2. Rod cells are non-functional
3. Cone cells are functional
4. Cone cells are non-functional

(vii) **Assertion (A):** Most leaves have their lower surface greener and shinier than the upper one.
**Reason (R):** Chloroplasts are concentrated in the upper layers of the leaf.

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

(viii) Given below are few statements which describe a particular technique.

I. It involves cutting of a small portion of vas deferens.
II. It is a surgical method of contraception.
III. The surgery is easier, quicker, and safer.

Which technique is being described above?

1. Tubectomy
2. Vasectomy
3. MTP
4. Hysterectomy

(ix) How many pairs of cranial nerves are found in the human body?

1. 12
2. 31
3. 7
4. 5

(x) Which of the following veins carry oxygenated blood?

1. Hepatic
2. Pulmonary
3. Renal
4. Systemic

(xi) **Assertion (A):** *Homo erectus* represented the first man-like ancestor in human evolution.

**Reason (R):** They had a cranial capacity ranging from 680-735 $cm^3$ and showed bent kneed posture.

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) Transpiration occurs

1. More from adaxial surface of a monocot leaf
2. More from adaxial surface of a dicot leaf
3. Equal from both the surfaces of a dicot leaf
4. More from abaxial surface of a dicot leaf

(xiii) Secretion of thyroxine hormone is stimulated by

1. Magnesium
2. Manganese
3. Iodine
4. Potassium

(xiv)The stage where chromosomes lie at the equator of the chromatic spindle is

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

(xv) A homozygous dominant guinea pig with black fur is crossed with a homozygous guinea pig with white fur. The $F_1$ generation is crossed with itself. What percentage of $F_2$ generation is expected to show white fur coat?

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

**Question 2**

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

(a) The part of the brain where the respiratory centre is located.
(b) The process of squeezing out of WBCs from the capillaries.
(c) The light-induced reaction which leads to splitting of water.
(d) The condition which results in abnormal long bones and long lower jawbone due to the hypersecretion of pituitary hormone.
(e) The process of development of fruits without fertilisation.

**(ii) Fill in the blanks with the appropriate word:** **[5]**

(a) Release of heated gases/water/effluents into water bodies is called .....
(b) A bundle of ..... enclosed in a tubular sheath is called a nerve.
(c) The shrinkage of the cytoplasm away from the cell wall when placed in a hypertonic solution is called .....
(d) The complex structure consisting of a DNA strand and a core of histones is called the .....
(e) The alternative forms of the same gene are called .....

**(iii) State whether the following statements are true or false. If false, rewrite the correct form of the statement by changing the last word only:** **[5]**

(a) The act of giving birth is called parturition.
(b) Deafness is caused by the rupturing of the pinna.
(c) The alpha cells of the pancreas produce insulin.
(d) Watson and Crick showed the double helical structure of the molecule of RNA.
(e) World Population Day is observed on July 11 every year.

**(iv) The first pair in the following lists indicates the kind of relationship that exists between both the items. Rewrite and complete the second pair on a similar basis.** **[5]**

(a) Photosynthesis : Chloroplast :: Transpiration : _____.
(b) Mineralocorticoids : Aldosterone :: Sex corticoids : _____.
(c) Cranial nerves : Cranium :: Spinal nerves : _____.
(d) Aerosols : Air pollution :: Oil spills : _____.
(e) Male : Scrotum :: Female : _____.

**(v) Match the terms in Column I with their explanations in Column II.** **[5]**

| Column I | Column II |
|---|---|
| 1. Pacemaker | a) Associated with static body balance |
| 2. Stroma | b) Associated with dynamic body balance |
| 3. Afferent nerve | c) Site of light reaction |
| 4. Prolactin | d) SA node |
| 5. Saccules | e) Stimulates production of milk by mammary glands |
| | f) Transmits impulses from receptor organ to spinal cord |
| | g) Site of dark reaction |

## SECTION B

***(Attempt any four questions from this section.)***

**Question 3**

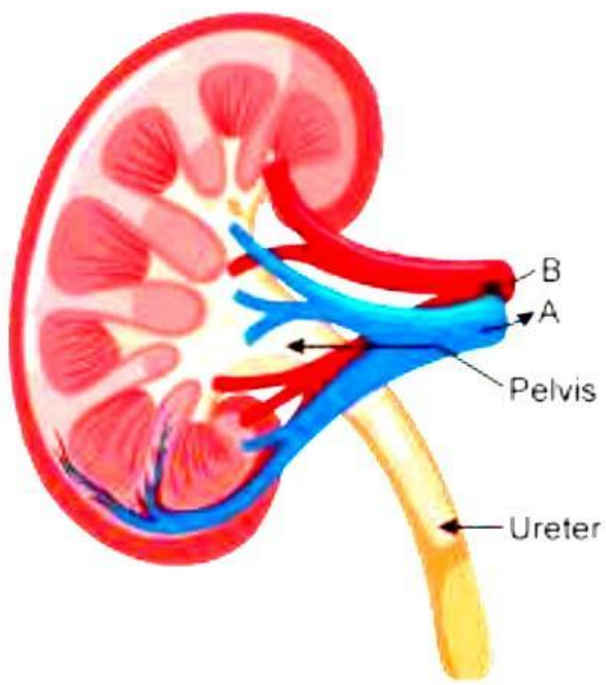
(i) Why does an alcoholic person walk clumsily when drunk? **[1]**

(ii) Draw a diagram of the internal ear and label the following: **[2]**
Semicircular canal, utriculus, sacculus, cochlea

(iii) What is photosynthesis? Write the balanced chemical equation for the same. **[2]**

(iv) State the significance of imbibition in plants. **[2]**

(v) Given below is a simple diagram of the human kidney cut open longitudinally. Answer the following questions. **[3]**




(a) Label A and B.

(b) Write two differences in the composition of the blood flowing through blood vessels A and B.

(c) Why does the cortex of the kidney show a dotted appearance?

**Question 4**

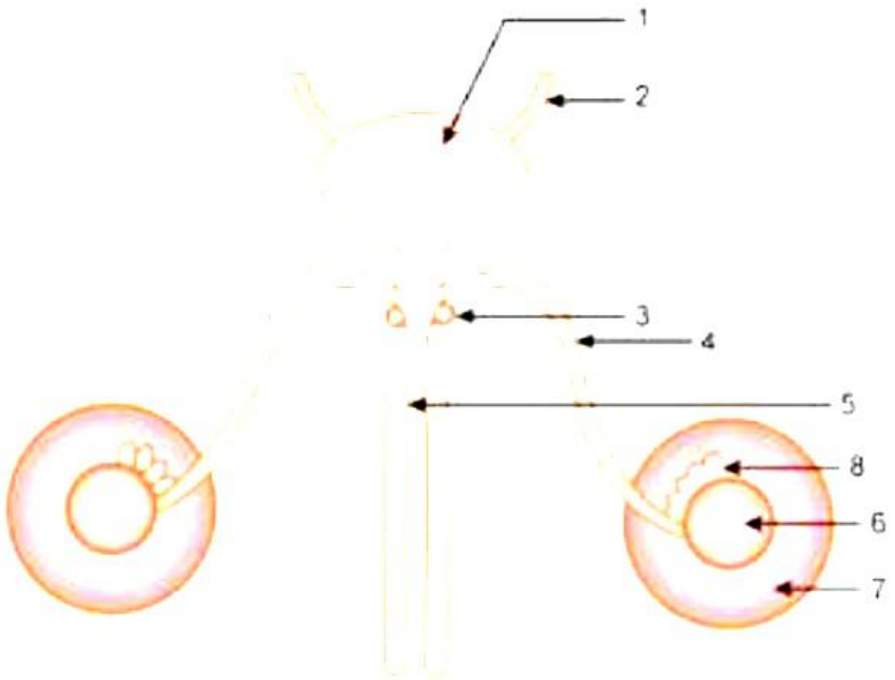
(i) Give reason: Transpiration is the price paid for photosynthesis. **[1]**

(ii) Mention two points for the importance of turgidity in plants. **[2]**

(iii) Briefly explain the need to control population (*Any two points*). **[2]**

(iv) Name and explain the process that occurs in the glomerulus. **[2]**

(v) Given below is the outline of the male reproductive system. **[3]**




(a) Label the parts 1–8.

(b) Name the corresponding structure of part (4) in the female reproductive system.

(c) List one function of part (3) and part (8).

**Question 5**

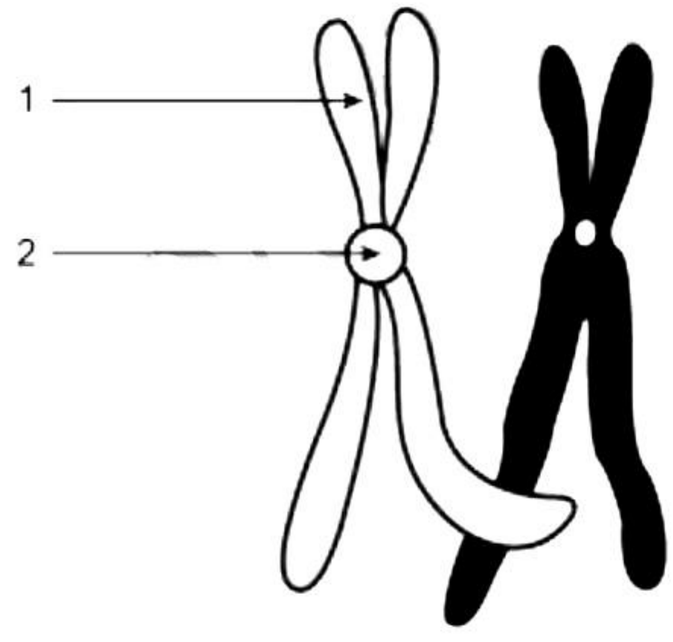
(i) Mention the role of ethylene in plants. **[1]**

(ii) Give reason: The left ventricle has thicker walls than the right ventricle. **[2]**

(iii) Write the scientific name of modern man. Mention its two characteristics. **[2]**

(iv) Why do the leaves of certain plants roll up on a bright sunny day? **[2]**

(v) The diagram shows a schematic representation of the start of a certain phenomenon in cell division. **[3]**




(a) Name the phenomenon and the type of cell division in which it occurs.

(b) Label the parts 1 and 2.

(c) What is the most significant aspect of this type of cell division?

**Question 6**

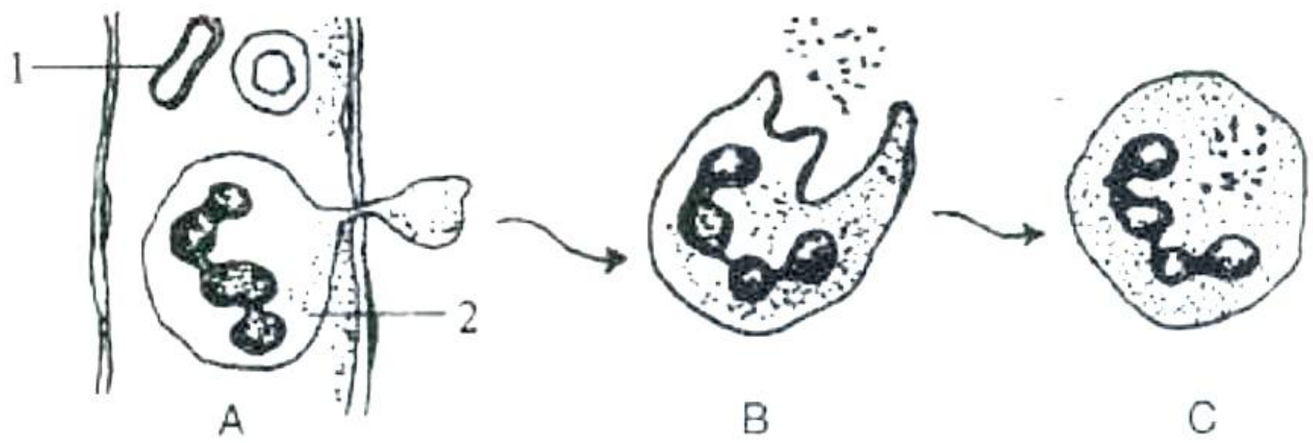
(i) Define: Centrifugal cytokinesis. **[1]**

(ii) State two differences between the eye and a photographic camera. **[2]**

(iii) Mention *any two* major functions of abscisic acid. **[2]**

(iv) Why is pancreas regarded as an exocrine as well as an endocrine gland? **[2]**

(v) Study the diagram carefully and then answer the questions that follow: **[3]**




(a) Name the cell labelled 1 and 2.

(b) Identify the phenomenon occurring in A.

(c) Mention two structural differences between 1 and 2.

**Question 7**

(i) Why do xerophytes have a thick cuticle? **[1]**

(ii) Write briefly as indicated in the brackets: **[2]**

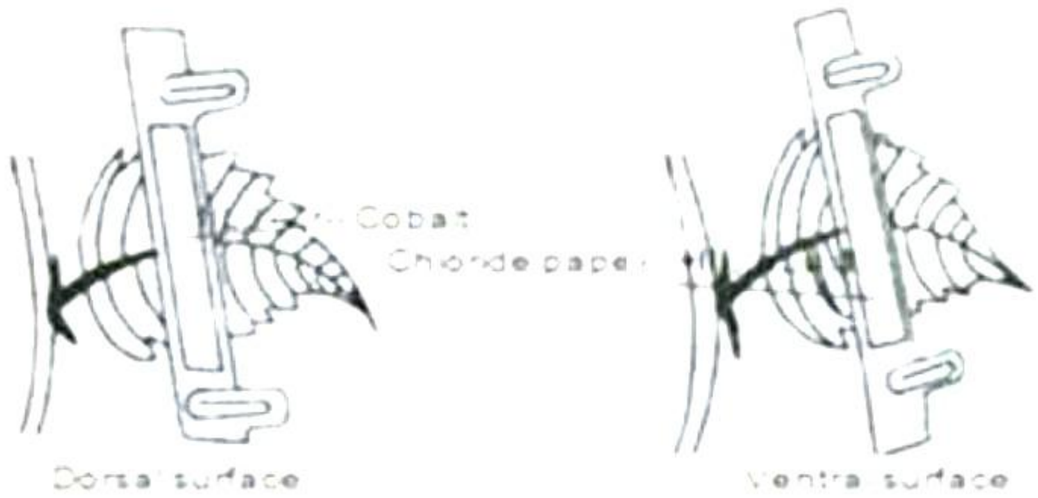
(a) Diabetic patient _____. (substance present in excess in the urine)

(b) Stomata _____. (gas given out during the day)

(iii) Mention two objectives of 'Swachh Bharat Abhiyan'. **[2]**

(iv) State the significance of meiosis (*Any 2 points*). **[2]**

(v) Given below is an experimental set-up to demonstrate a particular process in plants. Study the same and answer the questions that follow. **[3]**




(a) Name the physiological process being studied.

(b) What is the aim of the above experiment?

(c) What would you observe in the experimental set-up after an hour? Give reasons to support your answer.

**Question 8**

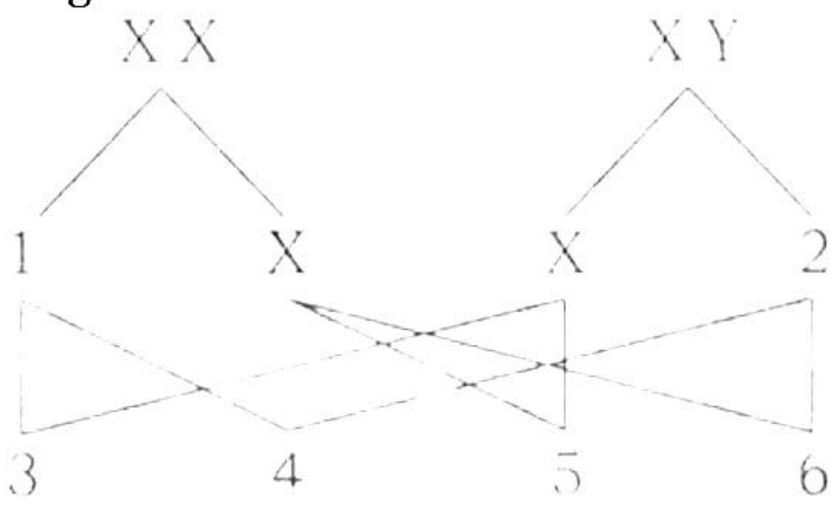
(i) Give reason: On sprinkling common salt on a lawn, the grass is killed. **[1]**

(ii) Why is insulin not administered orally, but injected into the body? **[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) Why is it necessary to keep a plant in the dark before carrying out an experiment on photosynthesis? **[2]**

(v) The given figure shows sex determination in humans. **[3]**




(a) What are the right substitutes for the numbers 1 to 6?

(b) What is the sex of the individuals represented by the numbers 3, 4, 5 and 6?

(c) Who is responsible for the sex of the offspring - male or female? Why?

# Solution

## SECTION A

**Solution 1**

(i) Both A and R are false
(ii) Testosterone
(iii) Gibberellin
(iv) The cells will be dead due to boiling
(v) A is true and R is false
(vi) Cone cells are non-functional
(vii) A is false and R is true
(viii) Vasectomy
(ix) 12
(x) Pulmonary
(xi) Both A and R are false
(xii) More from abaxial surface of a dicot leaf
(xiii) Iodine
(xiv) Metaphase
(xv) 25%

**Solution 2**

**(i)**

(a) Medulla oblongata
(b) Diapedesis
(c) Photolysis of water
(d) Acromegaly
(e) Parthenocarpy

**(ii)**

(a) Thermal pollution
(b) Axons
(c) Plasmolysis
(d) Nucleosome
(e) Alleles

**(iii)**

(a) True.
(b) False. Deafness is caused by the rupturing of the tympanum.
(c) False. The alpha cells of the pancreas produce glucagon.
(d) False. Watson and Crick showed the double helical structure of the molecule of DNA.
(e) True.

**(iv)**

(a) Stomata
(b) Testosterone
(c) Spinal cord
(d) Water pollution
(e) Labia majora

**(v)**

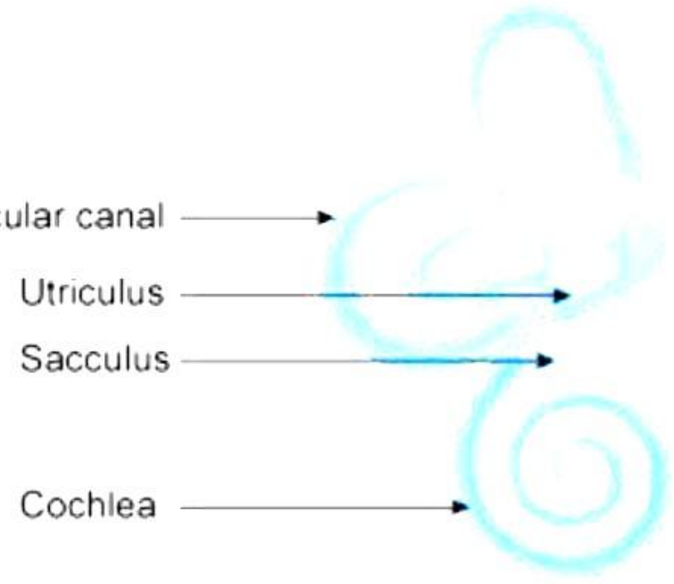
| Column I | Column II |
|---|---|
| 1. Pacemaker | d) SA node |
| 2. Stroma | g) Site of dark reaction |
| 3. Afferent nerve | f) Transmits impulses from receptor organ to spinal cord |
| 4. Prolactin | e) Stimulates production of milk by mammary glands |
| 5. Saccules | a) Associated with static body balance |

## SECTION B

**Solution 3**

(i) Alcohol affects the cerebellum which is the centre of body balance and coordination. Under the effect of alcohol, the cerebellum is unable to co-ordinate muscular movements properly. Therefore, a person after consuming alcohol walks clumsily.

(ii) Structure of the internal ear:




(iii) Photosynthesis is the process by which living plant cells containing chlorophyll, produce food substances (glucose and starch), from carbon dioxide and water, by using light energy and release oxygen as a by-product.

Balanced chemical equation for photosynthesis:

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6H_2O + 6O_2 \uparrow$$

(iv) Significance of imbibition in plants:

- It helps in germination of seeds and absorption of water by roots in the initial stages of plant growth.
- Imbibition pressure helps in the ascent of sap.

(v)

(a) A – Renal vein
B – Renal artery

(b) Differences in the composition of the blood flowing through blood vessels A (renal vein) and B (renal artery):

| Renal vein | Renal artery |
|---|---|
| • Carries deoxygenated blood | • Carries oxygenated blood |
| • Contains less water and urea | • Contains more water and urea |

(c) The cortex of the kidney shows a dotted appearance due to the presence of Malpighian corpuscles.

**Solution 4**

(i) Transpiration is the price paid for photosynthesis as the stomata is open for allowing carbon dioxide to diffuse in for photosynthesis. At the same time, water vapour escapes through the open stomata due to transpiration. This means transpiration is incidental to photosynthesis.

(ii) <u>Importance of turgidity in plants:</u>

1. Provides shape and rigidity to soft tissues.
2. Turgor in root cells builds up root pressure.

(iii) <u>Need to control population</u>: *(Any two points)*

- To ensure self-sufficiency in food
- To avail better education
- To minimise the pressure on fuels
- To avail better health services

(iv) The process of ultrafiltration takes place in the glomerulus.
The blood flows through the glomerulus under high pressure as the afferent arteriole is wider than the efferent arteriole. This creates a high hydrostatic pressure which causes the liquid part of the blood to filter out from the glomerulus into the renal tubule. This filtration is called ultrafiltration. During ultrafiltration, plasma along with organic and inorganic substances enter the Bowman's capsule. The fluid entering the renal tubule is called the glomerular filtrate.

(v)

(a) 1 – Urinary bladder
2 - Ureter
3 – Bulbo-urethral gland
4 – Vas deferens (Sperm duct)
5 – Urethra
6 – Testis
7 – Scrotum
8 – Epididymis

(b) Fallopian tubes (oviducts) in females are analogous to sperm ducts (4) in males. Sperm ducts carry sperms to the urethra, while fallopian tubes carry ova to the uterus.

(c) <u>Bulbo-urethral gland (3):</u> Secretion serves as a lubricant
<u>Epididymis (8):</u> Stores and allows the maturation of sperms before release.

**Solution 5**

(i) <u>Role of ethylene in plants:</u> *(Any two points)*

- Induces fruit ripening
- Promotes senescence
- Promotes root growth and root hair formation

(ii) The right ventricle pumps blood only up to the lungs for oxygenation. But the left ventricle pumps blood throughout the body, up to the toes in the feet or up to the brain against gravity. Hence, the left ventricle has thicker walls than the right ventricle.

(iii) The scientific name of modern man is *Homo sapiens sapiens*.
<u>Characteristics of *Homo sapiens sapiens*:</u> *(Any two)*

1. Perfect bipedal locomotion, with four reversed curves in the spine.
2. Cranial capacity ranging from 1450 – 1600 $cm^3$ and a much-enlarged cerebrum.
3. Highly reduced body hair.
4. Well-developed and prominent chin.
5. Entirely erect body posture.

(iv) On a bright sunny day, due to high temperatures, the rate of transpiration exceeds the rate of absorption of water by the leaves. This causes deficiency of water in the plants. Hence, on a bright sunny day, the leaves of certain plants roll up to minimise the loss of water.

(v)

(a) Crossing over. It occurs during meiosis.
(b) 1 – Chromatid
2 – Centromere
(c) The most significant aspect of meiosis is that the number of chromosomes in the sex cells is halved.

**Solution 6**

(i) Centrifugal cytokinesis follows the division of the nucleus when the cytoplasm divides by the formation of a cell plate in the centre, which then proceeds outwards.

(ii) <u>Differences between the eye and a photographic camera:</u>

| **Eye** | **Photographic camera** |
|---|---|
| Same light-sensitive layer is reused. | The light plate of the film must be replaced every time while taking a new picture. |
| Focusing is done by altering the shape of the lens. | Focusing is done by changing the distance between the lens and the sensitive plate. |

(iii)

Major functions of abscisic acid: *(Any two)*

1. Induces dormancy of buds and seeds.
2. Inhibits seed germination and development.
3. Stimulates closing of stomata.

(iv) Pancreas acts as an exocrine gland, which is a duct gland. It secretes pancreatic juice in the small intestine which helps in digestion.
The pancreas also contains the cells called Islets of Langerhans which are endocrine glands. They secrete the hormones insulin, glucagon, and somatostatin. Since pancreas performs both exocrine and endocrine functions, it is regarded as an exo-endocrine gland.

(v)

(a) 1 - Red blood cell (RBC) / Erythrocyte
2 – White blood cell (WBC) / Leucocyte

(b) Diapedesis

(c) Structural differences between RBCs (1) and WBCs (2):

| RBCs | WBCs |
|---|---|
| 1. Lack a nucleus. | 1. Have a nucleus. |
| 2. Biconcave and disc shaped. | 2. Spherical and varied sizes. |

**Solution 7**

(i) Xerophytes have a thick cuticle to check the excessive loss of water through transpiration.

(ii)

(a) Diabetic patient – Glucose (substance present in excess in the urine)

(b) Stomata – Oxygen (gas given out during the day)

(iii) Objectives of 'Swachh Bharat Abhiyan': *(Any two)*

1. To clean the streets, roads and infrastructure of the country's cities and towns.
2. To eliminate open defecation through the construction of individual, cluster, and community toilets.
3. To establish accountable mechanisms of monitoring latrine use.
4. To achieve efficient solid and liquid waste management systems.

(iv) Significance of meiosis:

- Due to crossing over, progeny with several variations can be produced. This also provides scope for evolution.
- The chromosome number of a species is kept constant.

(v)

(a) Transpiration

(b) The aim of the experiment is to demonstrate the difference in the rate of transpiration from the upper and the lower surface of a dicot leaf.

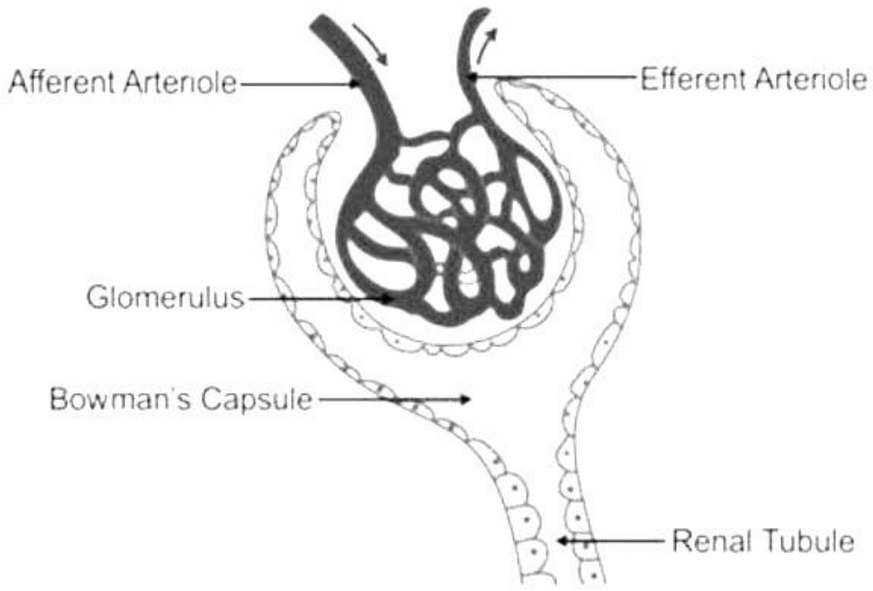
(c) The cobalt chloride paper which is attached to the dorsal surface of the leaf turns pink after an hour. This proves that more transpiration takes place from the dorsal surface of the leaf due to numerous stomata found on the lower epidermis of the leaf.

**Solution 8**

(i) On sprinkling common salt on a lawn, the grass is killed due to plasmolysis of grass cells because of high concentration gradient solution.

(ii) Insulin is a proteinaceous hormone. If administered orally, it might break down inside the stomach by the digestive juices during the process of digestion. Therefore, insulin is injected into the body and not administered orally.

(iii) <u>Malpighian corpuscle:</u>




(iv) The presence of starch can be regarded as evidence of photosynthesis. A plant used for experiments on photosynthesis should initially be placed in the dark for 24 - 48 hours to destarch the leaves. During this period, all the starch will be removed from the leaves and stored in the storage organs. The leaves will not show the presence of starch. So, the various experiments on photosynthesis can be carried out effectively.

(v)

(a) 1 - X
2 - Y
3 - XX
4 - XY
5 - XX
6 - XY

(b) 3 - Female
4 - Male
5 – Female
6 - Male

(c) Males are responsible for the sex of the offspring because males carry the Y chromosome. If a sperm carrying X chromosome fertilises an ovum which always carries an X chromosome, then the combination of sex chromosomes will be XX and the child born will be a female (girl). If a sperm carrying the Y chromosome fertilises an ovum, then the combination of sex chromosomes will be XY, and the child born will be a male (boy). Thus, the male (father) is responsible for the sex of the offspring.