

# ICSE 2025 EXAMINATION

## Sample Question Paper - 18

### 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) A monohybrid cross between axial and terminal flowers produces axial flowers in the  $F_1$  generation. Which of the following correctly represents the cross?
1.  $AA \times aa = Aa$
  2.  $Aa \times AA = Aa$
  3.  $aa \times Aa = AA$
  4.  $AA \times aa = AA$
- (ii) Which of the following phytohormones helps in the bending of shoot towards light?
1. Abscisic acid
  2. Ethylene
  3. Auxin
  4. Gibberellin
- (iii) Wild animals in a circus are trained to do many strange acts. These are largely through
1. Natural reflexes
  2. Voluntary reflexes
  3. Conditioned reflexes
  4. Involuntary reflexes

(iv) Seema is experiencing vomiting and watery bowels. As the intestines are unable to absorb water in the blood, the kidneys reabsorb almost all the water from the glomerular filtrate in the renal tubule along with urea. This condition is most likely due to

1. Glycosuria
2. Cholera
3. Haematuria
4. Albuminuria

(v) The absorption of water by dead cells due to surface attraction is termed as

1. Adsorption
2. Absorption
3. Guttation
4. Imbibition

(vi) One of the best solutions to get rid of non-biodegradable wastes is

1. Dumping
2. Incinerating
3. Recycling
4. Composting

(vii) The site of initiation of cell division in an animal cell is the

1. Cytoplasm
2. Centrosome
3. Nucleosome
4. Cell plate

(viii) Kiya wanted to perform the starch iodine-test to study photosynthesis. What should be the correct sequence of the steps?

- I. Boiling the leaf in alcohol.
  - II. Dipping the leaf in iodine solution.
  - III. Boiling the leaf in water.
  - IV. Rinsing the leaf with hot water.
1. I, II, III, IV
  2. III, I, IV, II
  3. II, I, IV, III
  4. IV, I, III, II

(ix) **Assertion (A):** Sometimes medicines dropped into the eyes come into the nose and even the throat.

**Reason (R):** Nasolacrimal duct conducts the secretion into the nasal cavity.

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

(x) Flight or fight hormone is produced by which gland?

1. Thyroid
2. Pituitary
3. Pancreas
4. Adrenal

(xi) **Assertion (A):** Mitosis is completed in two steps – Karyokinesis and Cytokinesis.

**Reason (R):** Karyokinesis is the division of the cytoplasm while cytokinesis is the division of the nucleus.

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) **Assertion (A):** The primary reproductive organs include all those structures, ducts and glands which help in the transfer and meeting of two kinds of sex cells.

**Reason (R):** Testes in males and ovaries in females are the primary reproductive organs in humans.

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

(xiii) Which of the following is caused due to a blockage in the coronary artery?

1. Atherosclerosis
2. Myocardial infarction
3. Thrombosis
4. Systemic lupus erythematosus

(xiv) **Assertion (A):** Modern man evolved from the Cro-Magnon man.

**Reason (R):** Cro-Magnons were much more advanced than the Neanderthals.

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

(xv) A statistical study of the human population is called

1. Demography
2. Topography
3. Anemography
4. Chirography

## Question 2

(i) Name the following:

[5]

- (a) The growth-retarding hormone in plants.
- (b) The point where crossing over occurs.
- (c) The condition in which both the alleles are identical.
- (d) The type of blood group in which both A and B antigens are present.
- (e) The part of the brain which controls the activities of internal organs.

(ii) Given below are five sets with four terms each. In each set, one term is odd. Choose the odd one out from the terms given and name the category to which the other three belong.

[5]

Set	Odd Term	Category
(a) Glomerulus, Collecting duct, Papilla, Bowman's capsule		
(b) Cerebrum, Ossicles, Cerebellum, Medulla Oblongata		
(c) Sneezing, Blinking, Typing, Coughing		
(d) Plasmolysis, Diffusion, Imbibition, Osmosis		
(e) Fallopian tube, Uterus, Vas deferens, Vagina		

(iii) Select and write the terms which do not fit with the description:

[5]

- (a) Reflex arc - Receptor, Sensory nerve, Cerebellum, Motor nerve, Effector organ
- (b) Organic nitrogenous wastes - Ammonia, Urea, Excess sodium chloride, Uric acid
- (c) Transpiration - Stomata, Cuticle, Hydathodes, Lenticels
- (d) Female reproductive system - Fallopian tube, Cowper's gland, Uterus, Vagina
- (e) Mitosis - Leptotene, Metaphase, Anaphase, Telophase

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

- (a) Chordae tendinae in the heart hold the apices of valves in position.
- (b) Atmospheric humidity promotes transpiration from a green plant.
- (c) Cones enable us to see three primary colours.
- (d) Duplicated chromosomes remain attached at a point termed as centrosome.
- (e) Movement of plant parts in response to water is geotropism.

**(v) State the difference between the following pairs:** **[5]**

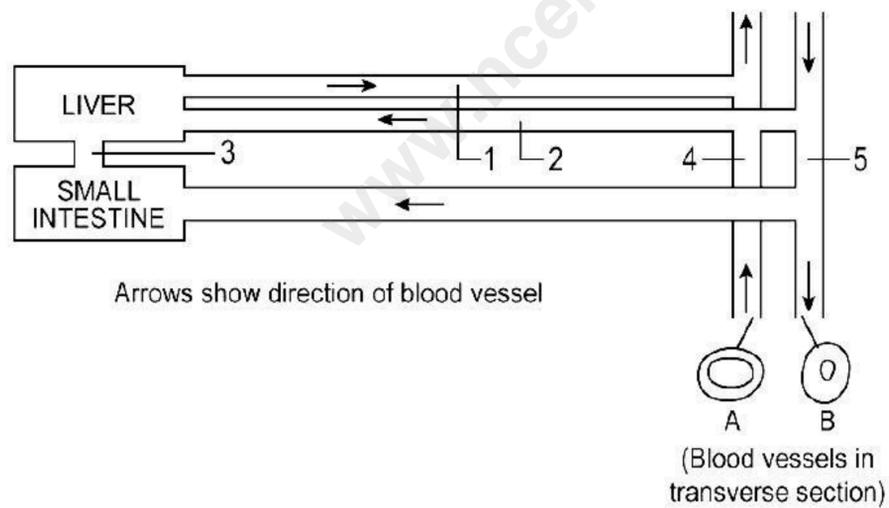
- (a) Rods and cones
- (b) Enzymes and hormones
- (c) Menarche and menopause
- (d) Mitosis and meiosis
- (e) Light reaction and dark reaction

## SECTION B

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

### Question 3

- (i) Write the full forms of the following abbreviations: [1]  
(a) TSH  
(b) ACTH
- (ii) If you are planning an experiment to show the effect of light on photosynthesis: [2]  
(a) Which light will you select – green light or white light? Give reason.  
(b) Why would you select a destarched plant for this experiment on photosynthesis?
- (iii) Explain why red–green colour blindness is more likely to occur in men than in women. [2]
- (iv) Why is it necessary to maintain a normal osmotic concentration of the blood? [2]
- (v) The figure below represents the liver of a mammal and its blood supply: [3]



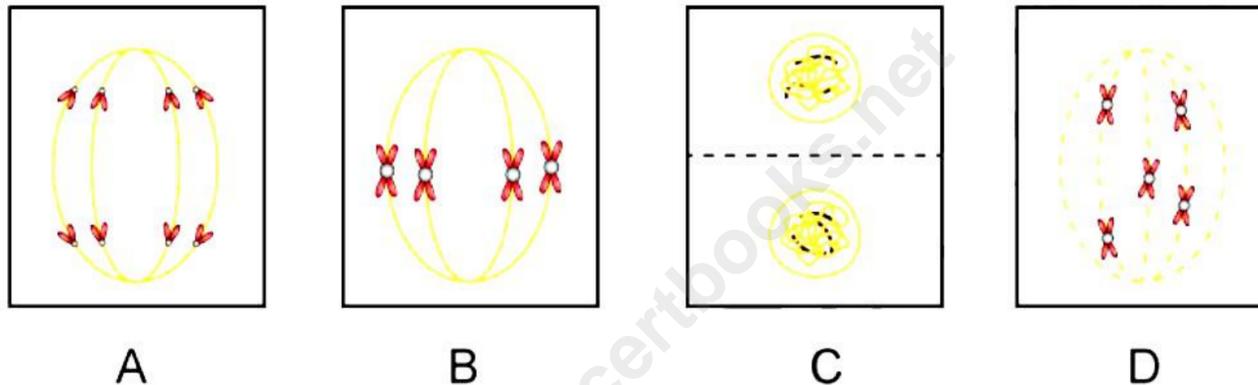
1. Name blood vessels 1, 2, 3, 4 and 5.
2. Why does blood vessel 3 join the small intestine to the liver?
3. Why does blood vessel B have a narrow lumen than blood vessel A?

**Question 4**

- (i) Transpiration is the price paid for photosynthesis. Justify. [1]
- (ii) Complete the following table of contrasting characters given by Mendel. [2]

S. No.	Character	Dominant trait	Recessive trait
1	Plant height		
2	Seed shape		

- (iii) Our resources cannot keep pace with the rising population of the country. Why? [2]
- (iv) Write about two characteristic features of *Homo erectus*. [2]
- (v) The diagram here represents four stages of cell division which are not in sequence. Study the diagrams carefully and then answer the questions: [3]



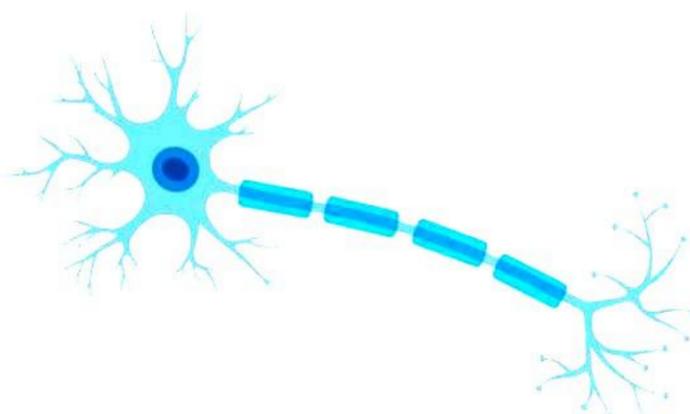
- (a) Redraw the diagrams in your answer sheet in a sequential order.
- (b) Label any four parts which are visible in the diagrams.
- (c) Is it a plant cell or an animal cell? Give a logical reason.

**Question 5**

- (i) What is the role of choroid in the human eye? [1]
- (ii) Name the diseases caused due to the following abnormal constituents in urine: [2]

Abnormal constituents	Diseases
(a) Glucose	.....
(b) Albumin	.....

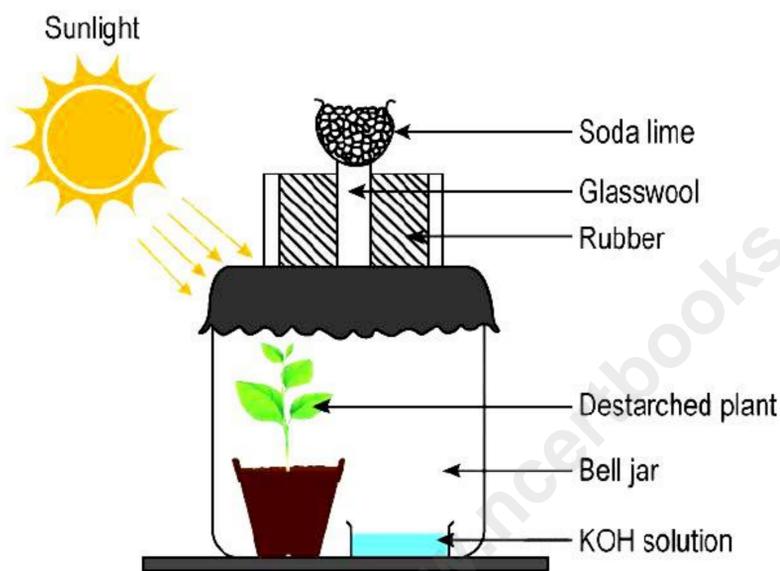
- (iii) Explain: Potato cubes when placed in water become firm and increase in size. [2]
- (iv) Give any two reasons why Mendel selected pea plant for his experiments. [2]
- (v) The figure given below is the basic structural and functional unit of the human nervous system. Study the diagram and answer the following questions: [3]



- (a) Write the technical term for the diagram.
- (b) Name two organs of our nervous system where these cells are richly found.
- (c) Name the cell organelle that is absent in these cells.

**Question 6**

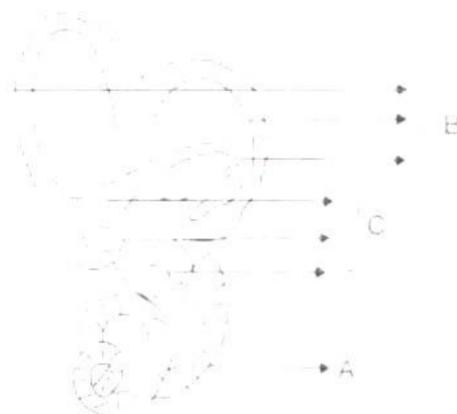
- (i) Arrange the phases of the menstrual cycle in the proper sequence. [1]  
Follicular phase, Luteal phase, Menstrual phase, Ovulatory phase
- (ii) Name the pigments present in urine, cones of eye, blood, and leaves. [2]
- (iii) Why do older people tend to feel colder than youngsters? [2]
- (iv) Mention the role of: [2]
  - (a) Ethylene
  - (b) Hypothalamus
- (v) An experiment was set up as shown in the diagram below. [3]



- (a) What is the aim of the experiment?
- (b) Why is KOH solution kept inside the bell jar?
- (c) What would be the result of the final step?

**Question 7**

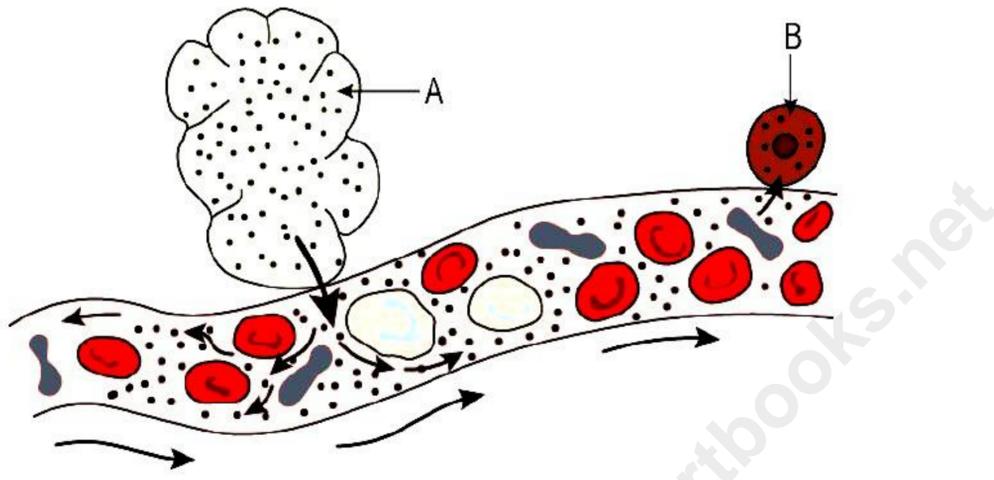
- (i) Define artificial insemination. [1]
- (ii) Mention two contrasting characters between *Australopithecus* and *Homo sapiens sapiens*. [2]
- (iii) State any two objectives of *Swachh Bharat Abhiyan*. [2]
- (iv) Give two advantages of a small family. [2]
- (v) Given below is a diagram of a part of the human ear. Study the same and answer the questions that follow: [3]



- (a) Name the parts labeled A, B and C in the diagram.
- (b) State the functions of the parts labelled 'A' and 'B'.
- (c) Name the audio receptor region present in the part labelled 'A'.

**Question 8**

- (i) Explain: Apical dominance. [1]
- (ii) Give reason: We urinate fewer times in summer than in winter and the urine passed is generally thicker. [2]
- (iii) List two measures for the control of pollution. [2]
- (iv) What are family welfare centres? What is the symbol of family welfare in India? [2]
- (v) Given alongside is a schematic representation of secretion of gland A and a blood capillary in its close proximity. [3]



- (a) What does the arrow coming out of gland A indicate?
- (b) What is the error shown in the given diagram?
- (c) If B is one of the target cells in the thyroid, name the secretion being poured out of gland A.

# Solution

## SECTION A

### Solution 1

- (i)  $AA \times aa = Aa$
- (ii) Auxin
- (iii) Conditioned reflexes
- (iv) Cholera
- (v) Imbibition
- (vi) Recycling
- (vii) Centrosome
- (viii) III, I, IV, II
- (ix) Both A and R are true
- (x) Adrenal
- (xi) A is true and R is false
- (xii) A is false and R is true
- (xiii) Myocardial infarction
- (xiv) Both A and R are true
- (xv) Demography

### Solution 2

- (i)
  - (a) Abscisic acid
  - (b) Chiasmata
  - (c) Homozygous
  - (d) Blood group - AB
  - (e) Medulla oblongata

(ii)

Set	Odd Term	Category
(a) Glomerulus, Collecting duct, Papilla, Bowman's capsule	Papilla	Parts of the kidney tubule or nephron
(b) Cerebrum, Ossicles, Cerebellum, Medulla Oblongata	Ossicles	Parts of the brain
(c) Sneezing, Blinking, Typing, Coughing	Typing	Natural reflexes
(d) Plasmolysis, Diffusion, Imbibition, Osmosis	Plasmolysis	Methods of absorption and conduction of water and minerals by plants
(e) Fallopian tube, Uterus, Vas deferens, Vagina	Vas deferens	Parts of the female reproductive system

(iii)

- (a) Cerebellum
- (b) Excess sodium chloride
- (c) Hydathodes
- (d) Cowper's gland
- (e) Leptotene

(iv)

- (a) True.
- (b) False. Atmospheric humidity reduces transpiration from a green plant.
- (c) True.
- (d) False. Duplicated chromosomes remain attached at a point termed as centromere.
- (e) False. Movement of plant parts in response to water is hydrotropism.

(v)

(a) Differences between rods and cones:

<b>Rods</b>	<b>Cones</b>
<ul style="list-style-type: none"><li>• Sensitive to dim light and contain the pigment rhodopsin.</li></ul>	<ul style="list-style-type: none"><li>• Sensitive to bright light, responsible for colour vision and contain the pigment iodopsin.</li></ul>

(b) Differences between enzymes and hormones:

<b>Enzymes</b>	<b>Hormones</b>
<ul style="list-style-type: none"><li>• Proteins secreted or produced at the site of metabolic reaction.</li></ul>	<ul style="list-style-type: none"><li>• Chemically can be proteins, steroids, or amino acids; produced by endocrine glands and transported to the target site by the blood.</li></ul>

(c) Differences between menarche and menopause:

<b>Menarche</b>	<b>Menopause</b>
<ul style="list-style-type: none"><li>• Onset of menstruation in young females at the age of 13 years.</li></ul>	<ul style="list-style-type: none"><li>• Permanent stoppage of menstruation in females at the age of 45 years.</li></ul>

(d) Differences between mitosis and meiosis:

<b>Mitosis</b>	<b>Meiosis</b>
<ul style="list-style-type: none"><li>• Helps in replacing the damaged cells and causes body growth.</li></ul>	<ul style="list-style-type: none"><li>• Helps in reproduction and brings about variation in the offspring.</li></ul>

(e) Differences between light reaction and dark reaction:

<b>Light Reaction</b>	<b>Dark Reaction</b>
<ul style="list-style-type: none"><li>• Takes place in the grana of the chloroplast and is dependent on light energy.</li></ul>	<ul style="list-style-type: none"><li>• Takes place in the stroma of the chloroplast and is independent of light energy.</li></ul>

## SECTION B

### Solution 3

(i)

- (a) TSH: Thyroid stimulating hormone
- (b) ACTH: Adrenocorticotropic hormone

(ii)

- (a) Light should be white since the process of photosynthesis is maximum in white light as green plants reflect green light.
- (b) Destarching of plants will ensure that any starch present after the experiment has been formed only under experimental conditions.

(iii) Red-green colour blindness is caused due to recessive genes present on the X chromosome.

Males have only one X chromosome. If there is a recessive gene present on the X chromosome, then the male will suffer from colour blindness.

Females have two X chromosomes. It is highly impossible that both the X chromosomes carry abnormal gene. Hence, if one gene is abnormal and since it is recessive, its expression will be masked by the normal gene present on the other X chromosome. Hence, females are unlikely to suffer from colour blindness.

(iv) It is necessary to maintain a normal osmotic concentration of the blood so that the tonicity between the blood and the body tissues does not differ. If this regulation mechanism fails, we either end up losing vital salts and water or may accumulate unwanted salts and excess water in our body. As a result, the cells may shrink or swell up. If swelling of a cell continues, the cell may burst and get damaged. This might disturb homeostasis of the body.

(v)

- (a) 1 → Hepatic vein
- 2 → Hepatic artery
- 3 → Hepatic portal vein
- 4 → Vena cava/Inferior vena cava
- 5 → Aorta/Dorsal aorta

(b) Hepatic portal vein (3) joins the small intestine to the liver so that the liver can monitor the blood glucose level. It can also help in detoxification and reduce the burden on the heart.

(c) Blood vessel B is an artery which consists of a thick muscular wall and narrow lumen because it has to pump blood under great pressure from the heart to various parts of the body. Blood vessel A is a vein which has a wider lumen. A vein consists of a thin muscular wall because blood flows continuously and under very little pressure through it.

#### 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)

S. No.	Character	Dominant trait	Recessive trait
1	Plant height	<u>Tall</u>	<u>Dwarf</u>
2	Seed shape	<u>Round</u>	<u>Wrinkled</u>

(iii) Our resources cannot keep pace with the rising population of the country because of the following reasons:

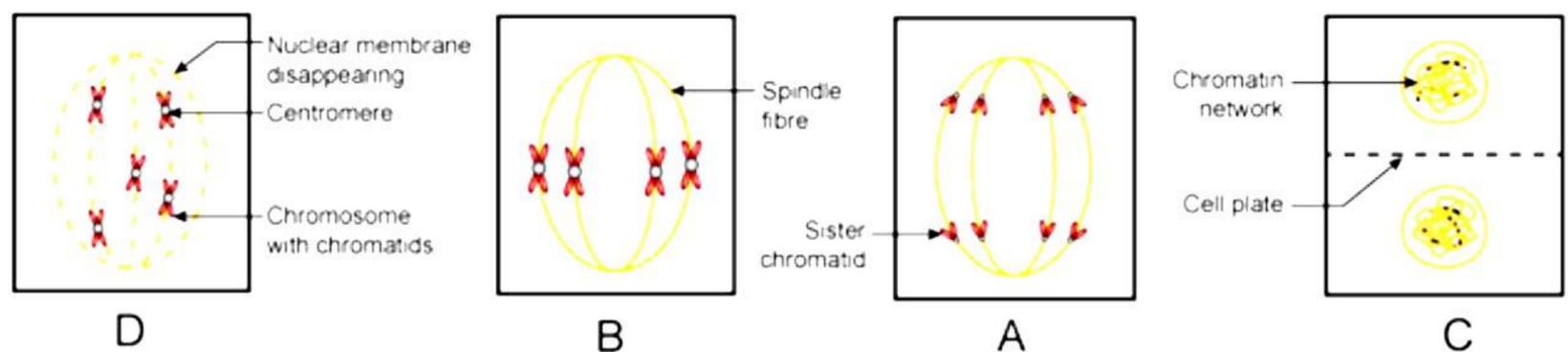
- Food production increases in arithmetic progression, while population grows in geometric progression. Thus, it is evident that we would be running short of food for the unchecked rising population.
- Availability of clean and germ-free water for drinking purposes would be scarcer with an increase in population; the reason being pollution of rivers, ponds, and lakes.
- Man is bringing more and more land under cultivation and also using up land for building more residential colonies, factories, and industries. Usable land would thus become less and less available.

(iv) Characteristic features of *Homo erectus*: (Any two)

1. Their cranial capacity ranged between 800-1125 cm<sup>3</sup>.
2. They stood erect and the proportion of their arms and legs resembled that of modern man.
3. Their forehead was receding, jaws were projecting, and their chin was absent.
4. Their pelvis was more bowl-shaped.

(v)

(a) Stages of cell division in a sequential manner:



(b) Parts visible in the diagrams are

1. Centromere
2. Spindle fibres
3. Sister chromatids
4. Cell plate

(c) It is a plant cell because cell plate formation takes place during telophase (C). Also, centrioles are absent, and a cell wall is present in the given diagrams.

### Solution 5

(i) Role of choroid in the human eye:

- It prevents the light rays from reflecting and scattering inside the eyes.
- It also provides nourishment to the eyes since it is richly supplied with blood vessels.

(ii)

<b>Abnormal constituents</b>	<b>Diseases</b>
(a) Glucose	<u>Glycosuria</u>
(b) Albumin	<u>Albuminuria</u>

(iii) Potato cubes contain excess of salts and sugars as compared to the water in which the cubes are placed. Hence, due to endosmosis, water from the surrounding enters the potato cubes making them firm and increasing their size.

(iv) Mendel selected pea plants for his experiments because of the following reasons:

*(Any two points)*

1. Many varieties of pea plants having contrasting traits were available.
2. Pea varieties were available in pure forms that bred true.
3. Pea flower is bisexual, so it can be normally self-pollinated.
4. Self-pollination could be prevented by removing the corresponding reproductive parts of the flower.
5. The size of the flower is very convenient, so cross pollination can be done artificially.
6. Two crops can be produced in one year since the reproductive span of pea plant is very short.

(v)

- (a) Neuron or nerve cell
- (b) Brain and spinal cord
- (c) Centrosome

## Solution 6

(i) Proper sequence of phases of the menstrual cycle:

1. Menstrual phase
2. Follicular phase
3. Ovulatory phase
4. Luteal phase

(ii) The pigments present are as follows:

Urine	Urochrome
Cones of eye	Iodopsin
Blood	Haemoglobin
Leaves	Chlorophyll

(iii) Heat production by the body is controlled by the thyroid gland. Due to ageing, heat production is lowered, and the body activities also slow down. The elasticity of the blood vessels decreases as age increases and hence, the circulation lowers down which results in lower body temperature. So, older people tend to feel colder than youngsters.

(iv)

(a) Role of Ethylene:

- Induces fruit ripening.
- Promotes senescence.

(b) Role of Hypothalamus:

- Releases hormones.
- Regulates body temperature.

(v)

(a) The aim of the experiment is to show that carbon dioxide is necessary for photosynthesis.

(b) KOH solution is kept inside the bell jar to absorb the carbon dioxide present in the jar.

(c) In the final step, the leaf does not turn blue black with iodine solution. This indicates that starch is not formed in the absence of carbon dioxide. Thus, carbon dioxide is necessary for photosynthesis.

### Solution 7

(i) The introduction of the semen into the genital tract (vagina) of the female by artificial means is called artificial insemination.

(ii) Contrasting characters between *Australopithecus* and *Homo sapiens sapiens*:

Characters	<i>Australopithecus</i>	<i>Homo sapiens</i>
Cranial capacity	450 to 600 cm <sup>3</sup>	1450 to 1600 cm <sup>3</sup>
Development of chin	Lack of chin, prognathous face	Prominent chin, snout disappeared

(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 establish an accountable mechanism of monitoring latrine use.
3. To achieve efficient solid and liquid waste management systems.
4. To eliminate open defecation through the construction of individual, cluster, and community toilets.

(iv) Advantages of a small family:

1. Parents can give more attention to their children.
2. Small family helps every country in controlling the growth of population.

(v)

(a) A - Cochlea

B - Semicircular canals

C - Ear ossicles

(b) Cochlea (A) helps in transmitting impulses to the brain via the auditory nerve.

Semicircular canals (B) help in maintaining dynamic equilibrium of the body.

(c) Organ of Corti

### Solution 8

(i) In most vascular plants, growth of the lateral buds occurs only after the removal of the apical buds. This phenomenon of suppression of the growth of the lateral buds by the apical buds is called apical dominance.

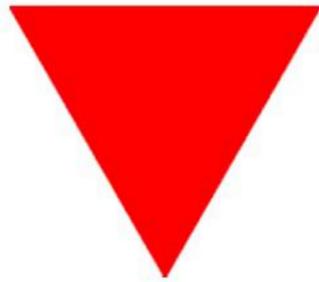
(ii) In summer, we lose a considerable part of the water through perspiration. As a result, the kidneys have to reabsorb more water from the glomerular filtrate making the urine concentrated. Thus, we urinate fewer times in summer than in winter and the urine passed is generally thicker.

(iii) Measures for the control of pollution: (Any two)

1. Use of unleaded petrol and CNG in automobiles.
2. Switching off the automobile engines at red lights and when not in use.
3. Installation of tall chimneys in factories and fitting them with filters and electrostatic precipitators.
4. Treating industrial effluents before discharging them into water bodies.
5. Setting up sewage treatment plants in larger habitations and septic tanks in houses.

(iv) Family welfare centres are those places where any help or advice about family planning is available free of cost. These places could be hospitals, dispensaries, and offices.

The inverted red triangle is the symbol of family welfare in India.



(v)

- (a) The arrow coming out of gland A indicates the direction of flow of hormone in the blood capillary.
- (b) The flow of the hormone cannot be in both directions. It should be in the direction of the flow of blood.
- (c) Thyroxine