ICSE Class 10 Biology Question Paper Solution 2016

BIOLOGY

SCIENCE Paper – 3

Question 1

(a) Name the following: [5]

(i) The exchange of chromatid parts between the maternal and the paternal chromatids of a pair of homologous chromosomes during meiosis.
(ii) The number of individuals inhabiting per unit area.
(iii) The immunity acquired by providing readymade antibodies from outside for treating certain infectious diseases.
(iv) The pollutants that cannot be broken down to simple and harmless products.
(v) The part of the brain that carries impulses from one hemisphere of the cerebellum to the other

(b) Choose the correct answer from each of the four options given below: [5]

(i) A plant cell may burst when:
A. Turgor pressure equalises wall pressure.
B. Turgor pressure exceeds wall pressure.
C. Wall pressure exceeds turgor pressure.
D. None of the above

(ii) The individual flattened stacks of membranous structures inside the chloroplasts are known as:
A. Grana
B. Stroma
C. Thylakoids
D. Cristae

(iii) The nephrons discharge their urine at the:
A. Urinary bladder
B. Urethra
C. Renal pelvis
D. Renal pyramid

(iv) Gigantism and Acromegaly are due to:
A. Hyposecretion of Thyroxine.
B. Hyposecretion of Growth hormone
C. Hypersecretion of Thyroxine
D. Hypersecretion of Growth hormone

(v) The mineral ion needed for the formation of blood clot is:

A. Potassium
B. Sodium
C. Calcium
D. Iron

(c) In each set of terms given below, there is an odd one and cannot be grouped in the same category to which the other three belong. Identify the odd term in each set and name the category to which the remaining three belong. [5]

Example: Ovary, Fallopian tube, Ureter, Uterus.
Odd term: Ureter
Category: Parts of female reproductive system.

(i) Sewage, Newspaper, Styrofoam, Hay.
(ii) Thymine, Cytosine, Adenine, Pepsin.
(iii) Malleus, Iris, Stapes, Incus.
(iv) Cortisone, Somatotropin, Adrenocorticotropic hormone, Vasopressin.
(v) Typhoid, Haemophilia, Albinism, Colour blindness.

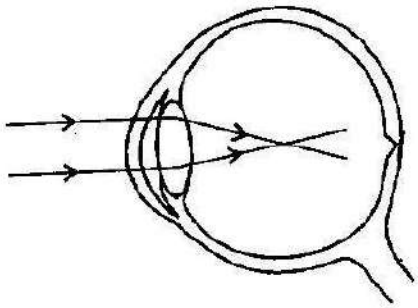
(d) Complete the following paragraph by filling in the blanks (i) to (v) withappropriate words: [5]

The amount of urine output is under the regulation of a hormone called (i) _____secreted by the (ii) _____ lobe of the pituitary gland. If this hormone secretion is reduced, there is an increased production of urine. This disorder is called (iii) _____. Sometimes excess glucose is passed with urine due to hyposecretion of another hormone called (iv) _____ leading to the cause of a disease called (v)_____.

(e) State the exact location of the following structures: [5]

(i) Centromere
(ii) Chordae tendinae
(iii) Thyroid gland
(iv) Ciliary body
(v) Proximal convoluted tubule.

(f) Given below is a diagram depicting a defect of the human eye,study the same and then answer the questions that follow: [5]



(i) Name the defect shown in the diagram.

(ii) What are the two possible reasons that cause this defect?

(iii) Name the type of lens used to correct this defect.

(iv) With the help of a diagram show how the defect shown above is rectified using a suitable lens.

(g) Given in the box below are a set of 14 biological terms. Of these, 12 can be paired into 6 matching pairs. Out of the six pairs, one has been done for you as an example. [5]

Example: endosmosis – Turgid cell.

Identify the remaining *five* matching pairs :

Cushing's syndrome, Turgid cell, Iris, Free of rod and cone cells, Colour of eyes, Hypoglycemia, Active transport, Acrosome, Addison's disease, Blind spot, Hyperglycemia, Spermatozoa, Endosmosis, Clotting of blood.

(h) State the main function of the following: [5]

(i) Lymphocytes of blood

(ii) Leydig cells

(iii) Guard cells

(iv) Eustachian tube

(v) Corpus luteum

Comments of Examiners

(a)

(i) Most candidates wrote the correct answer. However, a few were confused between Crossing over and Chiasma.

(ii) Most candidates wrote the correct answer. Demography was written as an occasional incorrect answer.

(iii) Only a few candidates were able to write the correct answer. Most however wrote immunity instead of passive immunity.

(iv) Majority of candidates wrote the correct answer. A few were unsure and wrote examples instead of the term.

(v) Only a few candidates answered correctly. Majority were confused with Corpus callosum and Pons.

Suggestions for teachers

- ✓ Train students to use biological/technical terms rather than common names. Insist on the correct spelling of biological terms.
- ✓ While teaching the structure of brain, lay stress on the location and function of Pons and corpus callosum.
- ✓ Give a clear understanding regarding the structure and functions of parts of ear and the precise location of the parts.
- ✓ With the help of a chart explain the transport of urine.

(b)

(i) Most candidates made the right choice. However, a few were unsure of Turgor Pressure and Wall Pressure.

(ii) The majority of candidates made the right choice in their selection.

(iii) Most candidates made the right choice. A few candidates were unsure of the path of urine.

(iv) Most candidates made the right choice. A few wereconfused with the disorder of Pituitary and Thyroid glands.

(v) Most candidates answered correctly.

(c)

(i) Most candidates were unaware of the pollutant Styrofoam and hence wrote incorrect answers.

(ii) Most candidates wrote the correct answer. However, a few did not know the category and Parts of DNA.

(iii) Some candidates failed to score as they wrote the category as parts of the ear.

(iv) The majority of candidates failed to identify the odd one and were unable to categorise the other 3. This was due to a poor understanding of endocrine glands and their secretions.

(v) Most candidates were able to identify the odd one and categorise the other 3.

(d)

(i) Answered correctly by candidates.

(ii) Some candidates were confused regarding the secretions of Anterior and posterior lobe of Pituitary gland.

(iii) Most candidates were able to answer correctly, but a few failed to differentiate between Diabetes mellitus and Diabetes insipidus.

(iv) Answered correctly by most candidates.

(v) Most candidates wrote the correct answer. However, a few wrote just Diabetes which in an incomplete answer.

Suggestions for teachers

- ✓ Guide students to clearly differentiate between Diabetes mellitus and Diabetes insipidus, Chromosome & Chromatid, Active and Passive immunity, Ciliary body and suspensory ligaments, Myopia and Hyperopia
- ✓ Advise students to read the statements carefully and understand it, before writing the answer.
- ✓ Importance of Calcium ions in the process of clotting of blood is to be stressed upon.
- ✓ Stress on the importance of prepositions like in, on, between, around while stating the location of structures and organs.
- ✓ Students must be trained to be specific and to the point when stating the main function of cells/organs/structures.
- ✓ Students must be taught the different types of WBC's and the specific importance of each in the body.
- ✓ The defects of the eye must be taught clearly and students should be able to identify them from a diagram.
- ✓ Insist upon drawing arrows for light rays entering the eye and the usage of an appropriate lens to correct the defects.
- ✓ Students must be given a clear understanding regarding the location of endocrine glands, their functions and secretions using charts and drawing diagrams.

(e)

(i) Most candidates wrote the correct answer. A few mentioned the location in chromosomes instead of chromatids and lost marks.

(ii) Only a few candidates were able to write the correct location. Most however mentioned only the word ' heart' and failed to score.

(iii) Majority of candidates wrote the correct answer. Answers of a few candidates were not specific. They just stated 'in the neck'/ ' below the neck' and did not score.

(iv) Only a few candidates were able to give the correct location. Most of them were confused and wrote the location of Suspensory ligaments instead of ciliary body.

(v) Answered correctly by most of candidates.

(f)

(i) Many candidates answered correctly. A few identified it as Hyperopia instead of Myopia.

(ii) Most of candidates answered correctly. A few candidates did not state the lengthening of eye ball from front to back as a reason.

(iii) Answered correctly by most candidates.

(iv) Candidates were able to draw a correct diagram. A few did not draw the arrows for light rays and lost marks.

Suggestions for teachers

- ✓ Structure and working of the human heart to be clearly with reference to Chordae tendinae, valves,and blood vessels entering and leaving the heart.
- ✓ Students must be trained to identify and odd term in the given list and then mention the category of the rest.
- ✓ Award marks only if the answers are complete and relevant during the school examinations.
- ✓ Train students to draw labelled diagrams of the phases of Mitosis and duplicated chromosomes.
- ✓ Lay emphasis on the changes visible in nucleus during mitosis as a result of which the different stages can be identified.
- ✓ Similar questions must be given in Unit Tests and Term examinations to enable students to get a clear understanding.

(g) Correct pairing was done by most candidates. A few were confused with cushing's Syndrome and Addison's disease.

(h)

(i) Most candidates were confused with the function of the different types of WBC's and wrote Phagocytosis for lymphocytes.

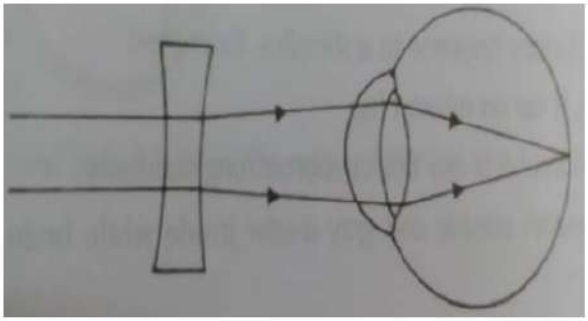
(ii) Most candidates wrote the correct answer. However, a few wrote the function of Seminiferous tubules instead of Leydig's cells.

(iii) Most candidates were casual in answering and did not specify the regulation of opening and closing of stomata.

(iv) Most candidates wrote the correct answer. A few lost marks as they did not mention the word 'air' in equalising air pressure.

(v) Correctly answered by candidates.

MARKING SCHEME **Question 1.**	
(a)	(i) Crossing over / genetic recombination/ cross joining (ii) Population density (iii) Passive immunity/artficially acquired Passive immunity (iv) Non biodegradable (v) pons
(b)	(i) B. Turgor pressure exceeds wallpressure (ii) C. Thylakoids/ A.Grana (iii) C. Renal pelvis (iv) D. Hypersecretion of growth hormones (v) B. Calcium
(c)	(i) Odd tem: Styrofoam Category of others: Biodegradable waste (ii) Odd term: Pepsin Category of others : Nitrogenous bases (iii) Odd term : Iris Category of others : Earossicles (iv) Odd term : Cortisone (hormone from adrenal gland) Category of others : hormones from pituitary gland) (v) Odd term: Typhoid Category: Genetic diseases
(d)	(i) Antidiuretic hormone / ADH / Vasopressin (ii) Posterior (iii) Diabetes insipidus/ water diabetes (iv) Insulin (v) Diabetes mellitus/ sugar diabetes
(e)	(i) The region of the chromosome to which the spindle is attached during cell division / Region joining the sister chromatids. (ii) The cords that arise from the ventricular muscles hold the flaps of the bicuspid and tricuspid valves in position. (iii) In front of the neck just below the larynx. (iv) Extension of the choroid of the eye. (v) In the cortex region of the kidney between the Malpighian capsule and loop of Henle.
(f)	(i) Myopia / short sightedness.

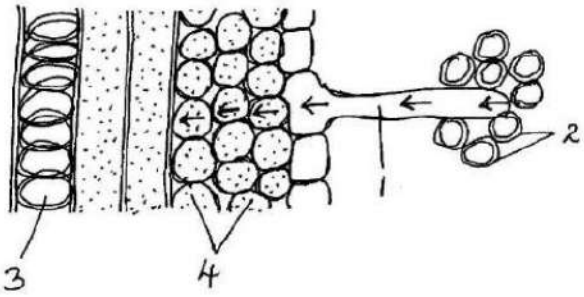
	(ii) 1. Eye ball is lengthened from front to back. 2. lens is too curved/ rounded (iii) concave (lens)/ diverging lens (iv)  Use of concave lens and focussing of image on the retina.
(g)	Cushing's syndrome --- hyperglycemia Acrosome ---- spermatozoa Iris ---- colour of eyes Free of rod and cone cells --- blind spot Addison's disease ---- hypoglycaemia
(h)	(i) Produce Antibodies (ii) Secrete Testosterone/ male sex harmones (iii) Regulates the opening and closing of stomata (iv) Equalises air pressure on either side of ear drum for it to vibrate freely. (v) Secretes progesterone to prepare the uterus for implantation of zygote.

SECTION II (40 Marks)

*Attempt any **four** questions from this Section*

Question 2

(a) The figure given below is a diagrammatic representation of a part of the cross section of the root in the root hair zone. Study the same and then answer the questions that follow: [5]



(i) Name the parts indicated by the guidelines 1 to 4.

(ii) Which is the process that enables the passageof water from the soil into the root hair?

(iii)Name the pressure that is responsible for the movement of water in thedirection indicated by the arrows. Define it.

(iv) Due to an excess of this pressure sometimes drops of water are found along the leaf margins of some plants especially in the early mornings. What is the phenomenon called?

(v) Draw a well labelled diagram of the root hair cell as it would appear if an excess of fertiliser is added to the soil close to it.

(b) Differentiate between the following pairs on the basis of what is mentioned within brackets: [5]

(i) Human skin cell and Human ovum (number of chromosomes)

(ii) Sperm duct and fallopian tube (function)

(iii) Red Cross and WHO (one activity)

(iv) Rod cells and cone cells (pigment)

(v) LUBB and DUP (names of the valves whose closure produce the sound)

Comments of Examiners

(a) (i) Only a few candidates were able to label all the parts correctly. Most candidates labelled 3 and 4 incorrectly which suggests that importance was not given to the internal structure of root with regard to absorption of water.
(ii) Most candidates answered correctly.
(iii)Correctly answered by candidates.
(iv) Most Candidates wrote the correct answer.
(v)Majority of candidates were unable to draw the correct diagram. Withdrawal of cell membrane from cell wall was not shown as they failed to understand the concept of Plasmolysis.

(b) (i) Majority of candidates answered correctly. A few failed to understand the question and hence wrote diploid and haploid.
(ii) Correct answers were written.
(iii) Answered correctly by candidates.
(iv) Most candidates answered correctly.
(v) A lot of confusion prevailed among the candidates regarding the valves in the heart and the sound produced during their closure. Most mentioned only one valve for each sound and lost marks. However, a few candidates answered correctly.

Suggestions for teachers

- ✓ Significance of Root Pressure and how it is developed must be clearly explained to students.
- ✓ Students must be taught to reason out practical examples in daily life related to Plasmolysis.
- ✓ Internal structure of root must be taught with the help of a chart.
- ✓ Effect of excess fertilizers on roots must be explained.
- ✓ Students must know the importance of shrunken protoplasm and withdrawal of cell membrane from cell wall when the cell is placed in a hypertonic solution.
- ✓ Assign regular practise in drawing turgid and flaccid root hair cell.
- ✓ While teaching the lesson on reproductive system, stress on the structure, location and function of each part.
- ✓ Guide students to express the activities of Red Cross and WHO and DUP.
- ✓ Stress on the correct spellings of the pigments of Rods and Cones.
- ✓ Advise students not to mention the terms - Haploid and Diploid, when the number of chromosomes are required for the different body cells.
- ✓ Structure and working of human heart to be explained with reference to opening and closure of valves and the sounds LUBB and DUP.

MARKING SCHEME

Question 2.

(a)

(i) 1. Root hair cell
2. Soil particles / soil water
3. xylem vessel
4. Cortex cells

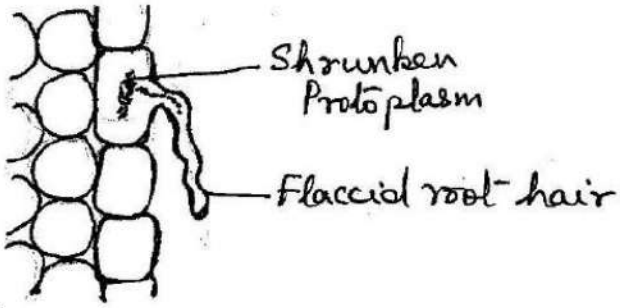
(ii) Endosmosis

(iii) Osmotic pressure / Root Pressure

- It is the minimum pressure to be exerted to prevent the passage of pure solvent into the solution when the two are separated by a semipermeable membrane
- It is the pressure caused due to cell to cell osmosis.

(iv) guttation/ exudation

(v)



diagr. :- shrunken protoplasm, flaccid root hair

(b)

(i) Human skin cell : 46/ 23 pairs

Human ovum : 23

(ii) Sperm duct: Transports sperms from testis to urethra

Fallopian tube: Its funnel shaped opening receives the mature eggs from the ovary which are carried by it to the uterus/It is the site of fertilisation.

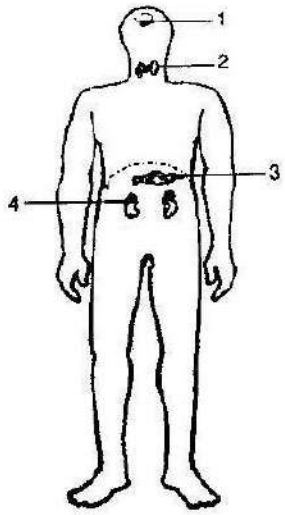
(iii) Red Cross:

- Extends relief to victims of any calamity like famine, fine, earthquakes, tsunamic
- Supplies blood
- Extends first aid
- Educates people in accident prevention
- Looks after maternal and child welfare centres
- Trains midwives, nurses
- Organises blood donation camps
- Arranges ambulance in emergencies

	(Any one) WHO: – Supplies information about epidemic diseases – Promotes projects for research on diseases – Gives information about cancer research, vaccines, nutritional discoveries, nuclear hazards, drug addiction – Suggests quarantine measures to prevent spread of diseases – Lays pharmaceutical standards – Organise campaigns for control of endemic and epidemic diseases. – Funds health projects – Makes health policies (iv) Rod cells : Rhodopsin/ visual purple Cone cells : Iodopsin/ visual violet (v) Bicuspid and tricuspid valve. Semilunar valves.

Question 3

(a) Given below is the outline of the human body showing the important glands: [5]



(i) Name the glands marked 1 to 4.

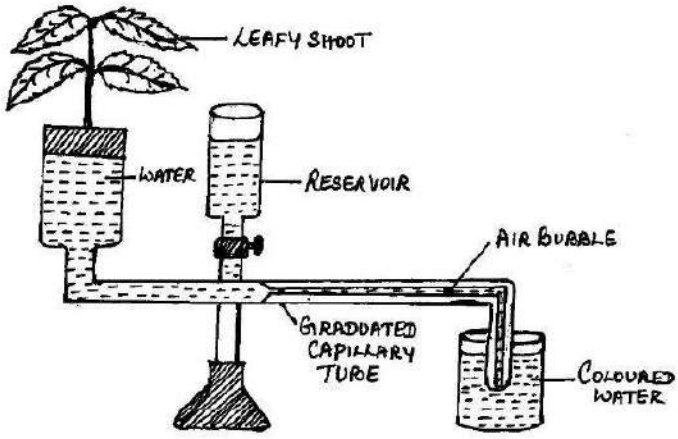
(ii) Name the hormone secreted by part 2. Give one importantfunction of this hormone.

(iii) Name the endocrine part of the part numbered3.

(iv) Why is the part labelled 1 called the master gland? Which partof the forebrain controls the gland labelled 1?

(v) Name the gland that secretes the'emergency hormone'.

(b) The diagram of an apparatus given below demonstrates a particular process in plants. Study the same and answer the questions that follow: [5]



(i) Name the apparatus.

(ii) Which phenomenon is demonstrated by this apparatus?

(iii) Explain the phenomenon mentioned in (ii) above.

(iv) State two limitations of using this apparatus.

(v) What is the importance of the air bubble in the experiment?

(vi) Name the structures in a plant through which the above process takes place.

Comments of Examiners

(a) (i) Most candidates labelled the parts correctly.

(ii) Most candidates wrote the correct answers. However, a few wrote Calcitonin but gave the function of Thyroxine.

(iii) Most candidates answered correctly. Some candidates were not specific and wrote Beta cells.

(iv) The majority of candidates were able to relate Pituitary gland and its functions. However, they were unsure of the part of the brain that controls it.

(v) Candidates wrote the correct answer.

(b) (i) The majority of candidates were able to name the apparatus. A few spelt Potometer as Photometer and lost marks.

(ii) Most candidates were able to name the physiological process. A few who unsure of the content and the corresponding physiological experiments identified the process as Photosynthesis instead of Transpiration.

(iii) The majority of candidates explained the phenomenon correctly. There were a few candidates who were careless and wrote an incomplete explanation.

(iv) Answered correctly by candidates.

(v) Most candidates failed to score as they did not know the significance of the air bubble in the experiment. They were vague in their answers and mentioned that it demonstrates transpiration.

(vi) Most candidates wrote the correct answer. Some however could not comprehend the question and hence wrote 'roots'/ 'leafy twig'.

Suggestions for teachers

- ✓ Draw the attention of students to the fact that all glands are not endocrine and that Pituitary gland is call the 'master gland' because its tropic hormones control the working of endocrine glands only.
- ✓ Instruct and guide students on how to answer precisely and clearly the aim of an experiment and the apparatus used to demonstrate various physiological experiments in plants.
- ✓ The working of endocrine glands, them functions and their secretions to be explained using charts or the blackboard to enable students to have a clear understanding.
- ✓ Train students to be specific and give clear and complete answers. Incomplete and vague answers must be pointed out.
- ✓ Advise students to take Practical work seriously to enable them to know the difference between Transpiration and Photosynthesis.

MARKING SCHEME **Question 3.**	
(a)	(i) 1. Pituitary gland 2. Thyroid gland 3. Pancreas 4. Adrenal gland (ii) Thyroxine; It controls basal metabolism // Influences general growth of the body / ossification of bone / body temperature / mental development. (iii) Islet of Langerhans / alpha , beta and delta cells. (iv) As it controls the secretion of other glands; Hypothalamus. (v) Adrenal gland/ supra renal gland
(b)	(i) Ganong's Potometer (ii) Transpiration/ measures rate of uptake of water due to transpiration (iii) It is the loss of water as water vapour from the aerial parts of the plant. (iv) – Introducing the air bubble is difficult – Twig may not be alive for a long period – Changes in the outside temperature / light/ humidity affects the postion of air bubble. *(Any two)* (v) Helps to calculate the rate of transpiration in a given time. (vi) Stomata, Lenticels, Cuticle

Question 4

(a) (i) Draw a well labelled diagram of the membranous labyrinth found in the inner ear. [5]

(ii) Based on the diagram drawn above in (i) give a suitable term for each of the following descriptions:

1. The sensory cells that helps in hearing.
2. The part that is responsible for static balance of the body.
3. The membrane covered opening that connects the middle ear to the inner ear.
4. The fluid present in the middle chamber of cochlea.
5. The structure that maintains dynamic equilibrium of the body.

(b) Give the Biological / technical term for the following: [5]

(i) Complete stoppage of menstrual cycle in females.

(ii) Pigment providing colour to urine.

(iii) The vein which drains the blood from the intestine to the liver.

(iv) The canal through which the testes descend into the scrotumjust before the birth of a male baby.

(v) The process causing an undesirable change in the environment.

(vi) The removal of nitrogenous wastes from the body.

(vii) The repeating components of each DNA strand lengthwise.

(viii)An alteration in the genetic material that can be inherited.

(ix) The process of uptake of mineral ions against the concentration gradient using energy from the cell.

(x) Blood vessels carrying blood to the left atrium.

Comments of Examiners

(a) (i) The concept of Membranous Labyrinth was not clear among the students. Most candidates did not draw the three semicircular canals and the cochlea. Many candidates drew all the parts of the ear.

(ii) The majority of candidates answered this question correctly. Some were confused with the parts responsible for static and dynamic balance of the body. A few candidates wrote Perilymph instead of Endolymph for the fluid in the middle chamber of Cochlea. Some candidates lost marks for writing Cochlea instead of organ of corti for sensory cells for hearing.

(b) (i) Answered correctly by candidates.

(ii) Some candidates did not attempt this part as they were unaware of the pigment Urochrome providing colour to urine.

(iii) Most candidates answered correctly. A few failed to score as they wrote Hepatic vein instead of Hepatic Portal Vein.

(iv) Answered correctly by candidates.

(v) Candidates wrote correct answer.

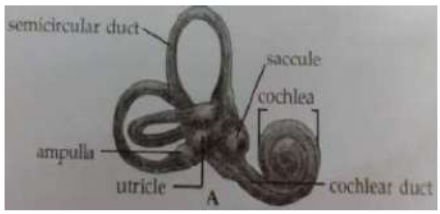
(vi) Answered correctly by most candidates.

(vii) Most candidates wrote the correct answer. Instead of writing nucleotides, some candidates specified the components of nucleotides and lost marks.

Suggestions for teachers

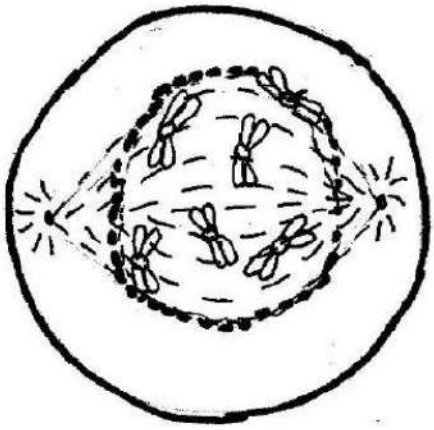
- ✓ Textbook explanations must be simplified for students so that they convey the answers in simple and short sentences.
- ✓ Charts and interactive boards can be used to explain the structure and functions of the parts of the ear.
- ✓ Students must be given a practiseto draw a labelled diagram of the membranous labyrinth.
- ✓ Clear explanations of Diffusion, Osmosis, Active transport and Imbibition must be given to students. Students must practise writing these definitions.
- ✓ Explain Circulation of blood with a simplified sketch to show blood vessels entering and leaving the heart.
- ✓ Importance of Hepatic Portal Vein must be emphasised.
- ✓ Advise students to read the question carefully before answering.

(viii) Candidates answered correctly.
(ix) Most candidates answered correctly. A few who were unsure of the concepts wrote diffusion /osmosis instead of Active transport.
(x) The majority of candidates were confused with the right and left side of the heart and hence failed to score for writing Venacava instead of Pulmonary veins.

MARKING SCHEME **Question 4.**	
(a)	(i)  diag. :- 3 semicircular canals shown, coils of cochlea Labelling :- semicircular canals, utriculus,ampulla, oval window, round window Sacculus, cochlea (ii) 1. Organ of corti/ spiral organ 2. Utriculus and sacculus. 3. Oval window / round window 4. Endolymph 5. Semi-circular canal
(b)	(i) Menopause (ii) urochrome (iii) Hepatic portal vein (iv) Inguinal canal (v) Pollution (vi) Excretion (vii)Nucleotides (viii)Mutation (ix) Active transport (x) Pulmonary vein

Question 5

(a) The given diagram shows a stage during mitotic division in an animal cell: [5]



(i) Identify the stage. Give a reason to support your answer.

(ii) Draw a neat labelled diagram of the cell as it would appear in the next stage. Name the stage.

(iii) In what two ways is mitotic division in an animal cell different from the mitotic division in a plant cell?

(iv) Name the type of cell division that occurs during:

A. Growth of a shoot

B. Formation of pollen grains.

(b) Give scientific reasons for the following statements: [5]

(i) Colour blindness is more common in men than in women.

(ii) Injury to medulla oblongata leads to death.

(iii) When an ovum gets fertilized, menstrual cycle stops temporarily in a woman.

(iv) Mature erythrocytes in humans lack nucleus and mitochondria.

(v) Blood flows in arteries in spurts and is under pressure.

Comments of Examiners

(a)

(i) Candidates were able to identify the Prophase stage with suitable reasons.

(ii) Most candidates wrote the correct answer for the stage after Prophase. However, many candidates lost marks for the diagram as they drew only five chromosomes. They failed to see the sixth chromosome lying close to the nuclear membrane.

(iii) Answered correctly by candidates.

(iv) Most candidates wrote the correct answer. A few lost marks as they could not spell Mitosis and Meosis correctly.

(b)

(i) Most candidates were unsure of the inheritance of sex linked diseases and their answers were vague. However, a few were able to give appropriate reasons.

(ii) Correctly answered by candidates.

(iii) Most candidates did not mention about the level of progesterone which increases to stop the menstrual cycle. Hence they could not score.

(iv) Answered correctly by candidates.

(v) Most candidates were unaware of the structure of arteries. They could not relate the thickness of walls and the narrow lumen to flow of blood.

Suggestions for teachers

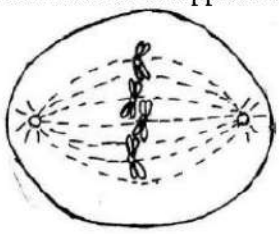
- ✓ Students must be trained to understand the visible changes in the nucleus during mitotic cell division as a result of which the stages can be identified.
- ✓ Insist on students drawing labelled diagrams of the different phases in mitosis with a given number of chromozomes.
- ✓ Clarify the concept of duplication of chromosomes during Prophase and separation of chromatids during Anaphase.
- ✓ Explain the difference between chromosome and chromatid, centromere and centrosome.
- ✓ Emphasise on the differences between mitosis in plant and animal cell.
- ✓ Explain clearly the compounds formed by haemoglobin in combination with oxygen, carbon dioxide and carbon monoxide to eliminate confusion between carbaminohaemoglobin and carboxyhaemoglobin.
- ✓ Give a clear understanding of the significance of the small size of RBCs and the absence of certain organelles in transporting oxygen.
- ✓ Explain the concept of recessive gene in men and women to give an idea about sex linked inheritance.
- ✓ Clarify the concept of increased level of Progesterone in maintenance of pregnancy and temporary stoppage of menstrual cycle.
- ✓ The understanding level of students must be tested through oral and written practice.
- ✓ A regular practice in giving reasons for biological statements should be given in all tests and examinations

MARKING SCHEME

Question 5.

(a)

(i) Prophase. Chromosomes have duplicated, nuclear membrane is disappearing, nucleolus has disappeared



(ii) Stage Metaphase

No. of chromosomes

Position of chromosomes

Any one labelling

(iii)

	Animal cell	**plant cell**
1.	Asters are formed.	1. Asters are not formed.
2.	Cytokinesis by formation of furrow in the cytoplasm.	2. Cytokinesis by cell plate Formation.
3.	Occurs in most tissues of the Whole body.	3. Occurs mainly at the at the growing tips and sides.

(Any Two)

(iv) A. Mitosis B. Meiosis

(b) Give scientific reasons for the following statements:

(i) Colour blindness is caused by a recessive gene located in the X chromosome. Y chromosome does not carry this gene. In males the single X chromosome carrying the gene expresses itself.

(ii) It controls the involuntary actions like breathing movements and beating of heart.

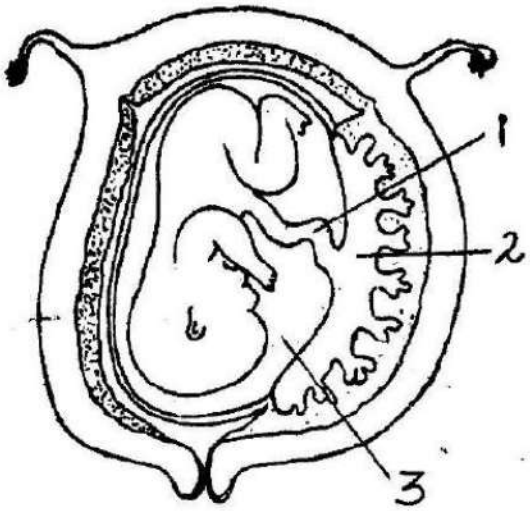
(iii) When ovum gets fertilized, implantation in the uterus takes place. progesterone level increases to prepare the uterine wall. Progesterone stops menstruation temporarily.

(iv) Absence of nucleus increases surface area for absorption and transport of O_2 to tissues. No cellular respiration as mitochondria is absent and hence does not use O_2 for itself.
(Any Two)

(v) because of the rhythmic ventricular contractions and the narrow lumen of arteries.

Question 6

(a) The diagram given below is that of a developing human foetus. Study the diagram and then answer the questions that follow: [5]



(i) Label the parts numbered 1 to 3 in the diagram.

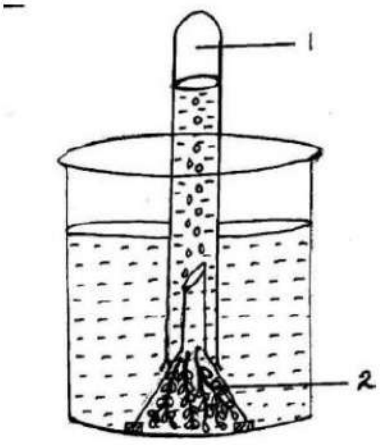
(ii) Mention any two functions of the part labelled 2 in the diagram.

(iii) Explain the significance of the part numbered 3 in the diagram.

(iv) Define the term 'Gestation'. What is the normal gestational period of the developing human embryo?

(v) Mention the sex chromosomes in a male and female embryo.

(b) The following diagram demonstrates a physiological process taking place in green plants. The whole set up was placed in bright sunlight for several hours. Study the diagram and answer the questions that follow: [5]



(i) What aspect of the physiological process is being examined?

(ii) Explain the physiological process mentioned in (i) above.

(iii) Label the parts numbered 1 and 2 in the diagram.

(iv) Write a well-balanced chemical equation for the physiological process explained in (ii) above.

(v) What would happen to the rate of bubbling of the gas if a pinch of sodium bicarbonate is added to the water in the beaker? Explain your answer.

Comments of Examiners

(a)

(i) Most candidates labelled the parts correctly. A few were confused with the location of Placenta and Amniotic fluid.

(ii) Correctly answered by most candidates.

(iii) Answered correctly by candidates.

(iv) Most candidates answered correctly

(v) Most candidates wrote correct answers. A few did not read the question properly and mentioned only one single sex chromosome as in gametes instead of a pair.

(b)

(i) The majority of candidates answered correctly. A few lost marks as they did not mention that oxygen is released during Photosynthesis.

(ii) Answered correctly by most candidates. Some failed to score as all the required terms such as carbon dioxide, water, chlorophyll, sunlight and glucose were not present.

(iii) Most candidates wrote the correct answer. Some were not precise and just mentioned- gas and plant instead of oxygen and hydrilla and lost marks.

(iv) Majority of candidates wrote the correct balanced equation. However, a few failed to score as the equation was not balanced or the factors necessary for photosynthesis were not mentioned.

(v) Most candidates were unaware of the reaction of sodium bicarbonate in water to increase carbon dioxide and so failed to score.

Suggestions for teachers

- ✓ The parts of female reproductive system and the development of embryo must be taught using charts and smart boards.
- ✓ A clear explanation must be given about the parts that aid in proper development of the foetus.
- ✓ Give a clear differentiation between Somatic and Sex chromosomes in males and females.
- ✓ Instruct and guide students to read the questions properly and answer precisely as to what is required.
- ✓ They should be made to know the difference between the aim of the experiment and the aspect of the physiological process.
- ✓ Students must be trained to write a complete balanced equation to represent photosynthesis.
- ✓ A list of submerged aquatic plants that can be used in experiments of photosynthesis must be given to students.
- ✓ Significance of adding Sodium bicarbonate to water for increasing the release of oxygen during photosynthesis must be emphasised.

MARKING SCHEME

Question 6.

(a)

(i) 1. Umbilical cord

2. Placenta

3. Amniotic fluid

(ii) – Diffusion of O_2 antibodies and nutrients from maternal blood to foetal blood.

- Diffusion of carbon dioxide, urea, uric acid from foetal blood to maternal blood

– Acts as a barrier and prevents germs from entering foetal blood
– Secretes Oestrogen and progesterone

(Any two)

(iii) – Absorbs mechanical shocks and prevents injury to foetus

– Keeps foetus moist
– Maintains even temperature around foetus
– Allows movement of foetus. *(Any one)*

(iv) Gestation: It is the full term development of embryo in the uterus

280 days / 40 weeks

(v) Male - XY

Female - XX

(b)

(i) Oxygen is released during Photosynthesis

(ii) It is the process by which living plant cells containing chlorophyll prepare food / glucose using CO_2 and water in the present of sunlight.

(iii)1. Oxygen

2. Hydrilla / Elodea / Aquatic plant

(iv) $6CO_2 + 12\ H_2O \xrightarrow[\text{Chlorophy}]{\text{Sunlight}} C_6H_{12}O_6 + 6H_2O + 6O_2$

(v) Bubbling of gas / O_2 increases. Plant gets more CO_2, hence rate of photosynthesis increases

Question 7

(a) A homozygous tall plant (T) bearing red coloured (R) flowers is crossed with a homozygous dwarf (t) plant bearing white (r) flowers :- [5]

(i) Give the genotype and phenotype of the plants of F_1 generation.

(ii) Mention the possible combinations of the gametes that can be obtained from the F_1 hybrid plant.

(iii) State the Mendel's law of Independent Assortment.

(iv) Mention the phenotypes of the offspring's obtained in F_2 generation.

(v) What is the phenotypic ratio obtained in F_2 generation?

(b) Briefly explain the following terms : [5]

(i) Reflex action

(ii) Power of accommodation

(iii) Photophosphorylation

(iv) Hormone

(v) Synapse

Comments of Examiners

(a)

(i) The majority of candidates were unable to differentiate between Ph_ecotype and Genotype and between F1 and F2 generation and hence could not write the correct answer.

(ii) Most candidates were unable to understand the question and failed to list the possible combination of gametes.

(iii) Most candidates failed to explain the law correctly. They were confused with the 3 laws. Some candidates wrote all the 3 laws as they did not understand the question.

(iv) Majority of candidates answered correctly.

(v) Answered correctly by candidates.

(b)

(i) Explanation was mostly incomplete. It was felt that stress was not laid on important words like involuntary, automatic and quick actions. Most candidates failed to score.

Suggestions for teachers

- ✓ Students must be given a clear understanding of technical terms used in genetics like- Genotype, Phenotype, Genotypic ratio and Phenotypic ratio.
- ✓ Monohybrid and Dihybrid cross,F1 and F2 generation to be explained clearly with simple examples using contrasting characters.
- ✓ Train students to understand and state Mendel's laws in simple words, giving importance to operative words.
- ✓ Significance of sunlight and chlorophyll in photosynthesis should be stressed upon.
- ✓ The various steps leading to the formation of glucose must be clearly explained.

(ii) Most candidates wrote the correct answer. Some failed to give a complete explanation regarding focal length of lens and distance of objects and lost marks.

(iii) Most of the answers were vague. Candidates failed to mention the significance of sunlight and chlorophyll for Photosynthesis to convert ADP to ATP.

(iv) Only a few candidates wrote a complete answer. Most of them did not mention the term Endocrine glands in the definition.

(v) Majority of candidates were able to write the correct explanation. A few were not specific and wrote an incomplete explanation e.g. point of contact between two neurons.

Suggestions for teachers

- ✓ Explain clearly the difference between Reflex action and Voluntary action and the parts of the brain involved in these actions.
- ✓ Explain the concept of accommodation of eye and adaptation of eye with examples.
- ✓ Writing practice must be given for all definitions emphasizing on operative terms.

MARKING SCHEME **Question 7.**	
(a)	(i) Genotype of F_1 generation:-Heterozygous Tall with Red flowers TtRr Phenotype: - tall red flowers (ii) TR, tR, Tr, tr (iii) Law of Independent assortment When there are two pairs of contrasting characters, the distribution of the members of one pair into the gametes is independent of the distribution of the othe pair. (iv) Tall red , Dwarf red , tall white; dwarf white. (v) 9:3:3:1
(b)	(i) Reflex action: It is an automatic, quick and involuntary action (ii) Power of accommodation:The ability of the lens to focus the eye at near and far distances. (iii) Photophosphorylation: The formation of energy rich compound adenosine triphosphate (ATP) fromadenosinediphosphate (ADP) and inorganic phosphate in the presence of light. (iv) Hormone: Secretions of endocrine glands which are poured into the blood to act on target organs or cells of the body. (v) Synapse: It is the point of contact between the texminal branches of axon with the dendrites of the next neuron.

Topics found confusing/difficult:

- Parts and function of male and female reproductive system in man
- Menstrual cycle
- Identifying experiments associated with Transpiration from those of Photosynthesis
- Stating the exact location of structures/organs in the body of plants and animals
- Internal structure of heart, valves and blood vessels associated with heart, left and right side of heart
- Distinguishing Phenotype and Genotype, F1 & F2 generations.
- Laws of Mendel.
- Parts of eye and ear and their functions
- Defects of eye, Accommodation and Adaptation of eye
- Parts of brain and their functions
- Explanations of biological terms
- Giving appropriate reasons for biological statements
- Stages of Mitosis, difference between chromosome and chromatid
- Identifying the odd term and mentioning the category of the rest
- Effect of hypertonic solution on root hairs
- Hyposecretion and hypersecretion of hormones

Suggestions for students:

- Make optimum use of the 15 minutes reading time to understand and assimilate the finer points in the question paper. Make your choice of questions as per the rubrics and plan and organise your work.
- Comprehend what is being asked before beginning to write your answers.
- Follow the pattern of the example if given for a question.
- Do not overlook any part of a question and avoid being in a hurry to conclude an answer.
- All questions are equally scoring.
- Definitions and explanations of biological terms must be precise and complete.
- Practise drawing neat and labelled diagrams.
- Practise a number of examples for Monohybrid and Dihydrid cross.
- Pay attention to fine details in performing an experiment in plant physiology. You should be able to state the aim and result of the experiment clearly.
- Do not attempt questions more than what is asked in the rubrics of the question paper. Instead go through your answers carefully and check for mistakes in terms of spellings or expression of your thoughts.
- Do not deviate from the scope of the syllabus.