ICSE 2025 EXAMINATION

Sample Question Paper - 2

Biology

Time Allowed: 2 hours **Maximum Marks: 80**

General Instructions:

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

1. **Question 1: Choose the correct answers to the questions from the given options. [15]**
(Do not copy the question, write the correct answers only.)

(i) The lower surface of leaf will have more number of stomata in a **[1]**

a) isobilateral leaf
b) isotopicbilateral leaf
c) dorsiventral leaf
d) both dorsiventral and isobilateral leaf

(ii) Lampbrush chromosome where two homologous chromosomes with several chiasmata with several loops in the chromatic region are found in _____. **[1]**

a) Hair cells
b) Bean inflorescence
c) Egg yolks
d) Skin cells

(iii) Which of the following is true about neurilemma? **[1]**

a) A layer of fatty substance around axon
b) A layer of specialised neuroglia around myelin sheath of nerve fibres

c) The cell membrane around the nerve cell

d) The connective tissue around a nerve tract

(iv) Which one of the following is non-biodegradable? **[1]**

a) Cardboard

b) Vegetable peel

c) Bark of trees

d) DDT

(v) The duration of a cardiac cycle is **[1]**

a) 0.9 second

b) 0.7 second

c) 0.8 second

d) 0.6 second

(vi) **Assertion (A):** Arctic's ozone depletion tends to be milder and short lived than the Antarctic's. **[1]**

Reason (R): CFCs, Frigid temperatures and sunlight are not present at the Arctic at the same time.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

(vii) Which method of contraception can provide protection against transmission of AIDS, syphilis and gonorrhoea? **[1]**

a) Female sterilisation (tying oviducts)

b) Condoms

c) Male sterilisation (cutting sperm ducts)

d) Oral contraceptive pills

(viii) Glomerular filtrate and blood plasma differ in the fact that **[1]**

a) plasma contains high level of chlorides

b) plasma contains proteins

c) Both glomerular filtrate contains proteins and plasma contains high level of chlorides

d) glomerular filtrate contains proteins

(ix) The function of light energy used in photosynthesis is to **[1]**

a) split CO_2

b) reduce CO_2

c) Deactivate chlorophyll

d) activate chlorophyll

(x) Testes produce the hormone. **[1]**

a) oxytocin

b) progesterone

c) testosteron

d) oestrogen

(xi) Synthesis phase in the cell cycle is called so, because of the synthesis of more: **[1]**

a) RNA

b) RNA and proteins

c) Glucose

d) DNA

(xii) Which of the following glands is known as master gland? **[1]**

a) Pituitary

b) Pancreas

c) Kidneys

d) Adrenal glands

(xiii) Nuisance growth of aquatic plants and bloom-forming algae in natural water is generally due to high concentrations of **[1]**

a) phosphorus

b) calcium

c) carbon

d) sulphur

(xiv) The process of fixation of CO_2 into a stable organic intermediate occurs by **[1]**

a) carboxylation

b) isomerisation

c) regeneration

d) reduction

(xv) Aqueous humour is present between the **[1]**

a) Cornea and Lens

b) Lens and Retina

c) Iris and Lens d) Cornea and Iris

2. **Question 2** **[25]**

(i) **Name the following:**

i. The outward movement of water molecules causes the cell to become flaccid. **[1]**

ii. The permanently open structures seen on the bark of an old woody stem. **[1]**

iii. The wax-like layer on the epidermis of leaves which reduces transpiration. **[1]**

iv. The hormone that regulates the basal metabolic rate. **[1]**

v. Group of hormones which influence other endocrine glands to produce hormones. **[1]**

(ii) **Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence beginning with the term that is underlined.**

i. Given below is the set of five terms. Rewrite the terms in logical sequence as directed at the end of each statement. **[1]**
Vagina, ovary, uterus, oviduct, cervix. (pathway of egg after ovulation)

ii. Given below are sets of five terms each. Rewrite the terms in correct order in a logical sequence beginning with the first word that is underlined: **[1]**
Conjunctiva, Yellow spot, Pupil, Vitreous Humour, Aqueous Humour.

iii. The statement given below is incorrect. Rewrite the correct statement by changing the underlined words of the statement. **[1]**
Free movement of solutes, in and out of the cell takes place across the cell membrane.

iv. The first process by which water gets into the seed coat during germination is osmosis. **[1]**

v. Adenine : Thymine :: Cytosine : _____ **[1]**

(iii) **Fill in the blanks with suitable words:**

i. Copy and complete the following by filling in the blanks 1 to 5 with appropriate words. **[5]**

The human female gonads are ovaries. A maturing egg in the ovary is present in a sac of cells called (i)_____. As the egg grows larger, the follicle enlarges and gets filled with a fluid and is now called the (ii)_____ follicle. The process of releasing the egg from the ovary is called (iii)_____. The ovum is picked up by the oviduct funnel and fertilization takes place in the (iv)_____. In about a week the blastocyst gets fixed in the endometrium of the uterus and this process is called (v)_____.

(iv) **Choose the odd one out from the following terms and name the category to which the others belong:**

i. Urethra, uterus, urinary bladder, ureter. **[1]**

ii. Cortisone, somatotropin, adrenocorticotropic hormone, vasopressin **[1]**

iii. Insulin, Adrenaline, Pepsin, Thyroxine. **[1]**

iv. Sewage, Newspaper, Styrofoam, Hay **[1]**

v. Formalin, Iodine, DDT, Lime **[1]**

(v) **Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs.**

i. Match the following columns. **[5]**

Column I	Column II
(a) Liver	(i) Knot-like tuft of blood capillaries in Bowman's capsule.
(b) Skin	(ii) Breakdown of proteins.
(c) Kidney	(iii) Sweat glands.
(d) Glomerulus	(iv) Bean-shaped excretory organ.

Section B

Attempt any 4 questions

3. **Question 3** **[10]**

(i) Write the genotype of haemophilic son and carrier daughter. **[1]**

(ii) Explain the following terms: **[2]**

i. Monohybrid cross

ii. Gene

iii. Phenotype

(iii) Name a cell that is found arrested in diplotene stage for months and years. Comment in 2-3 lines how it completes cell cycle? **[2]**

(iv) How many alleles of genes for X-linked traits are present in female and male individuals, respectively? **[2]**

(v) Draw a well labelled diagram to show the metaphase stage of mitosis in an animal cell having four chromosomes. **[3]**

4. **Question 4** **[10]**

(i) State the function of the suspensory ligament of the eye. **[1]**

(ii) Write short notes on the following. **[2]**

i. Cochlea

ii. Organ of Corti

(iii) Write the function of the following: **[2]**

i. Suspensory ligament

ii. Semicircular canals

(iv) In what way sulci are different from gyri? **[2]**

(v) Draw a well labelled diagram of a neuron showing the following parts: Dendrites, axon, node of Ranvier and myelin sheath. **[3]**

5. **Question 5** **[10]**

(i) Does dark reaction occur in dark or night? Does it not require light? **[1]**

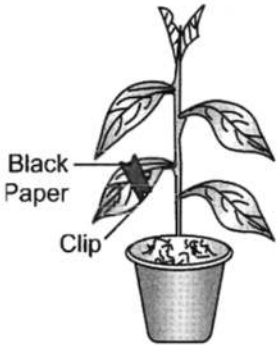
(ii) Plants have several pigments that can catch light energy. Two of these are chlorophyll-a and chlorophyll-b, which harness light of different wavelengths. **[2]**

What advantage does a plant obtain by having molecules that act at different wavelengths?

(iii) What conditions enable RuBisCO to function as an oxygenase? Explain the ensuring process. **[2]**

(iv) Explain the mechanism of opening and closing of stomata. **[2]**

(v) The diagram given below represents an experiment conducted to prove the importance of a factor in photosynthesis. Study the same and then answer the questions that follow. **[3]**



a. Name the factor being studied in this experiment.

b. Name the solution used to test for the presence of starch in the leaf and put it.

c. Give a balanced chemical equation to represent the process of photosynthesis.

6. **Question 6** **[10]**

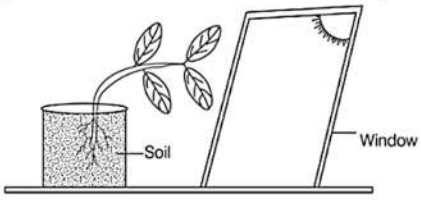
(i) Give example of nitrogen base in DNA. **[1]**

(ii) Discuss with your teacher about **[2]**

i. haploid insects and lower plants where cell division occurs.

ii. some haploid cells in higher plants where cell division does not occur.

(iii) The diagram given below represents a plant growing in a glass jar. The glass jar is placed near a window. Study the diagram and answer the questions that follows: **[3]**



a. Name the tropic movements shown by the shoot and roots.

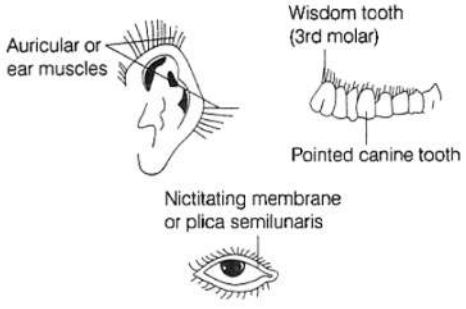
b. What is the stimulus that made the shoot bend towards the window?

c. Which plant hormone caused the above effect?

7. **Question 7** **[10]**

(i) Name the scientist who also came to similar conclusion as Darwin. Where did he work? **[1]**

(ii) Given below are the few structures of human body. **[2]**



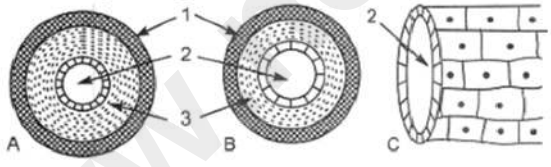
i. What do these structures called?

ii. Give any two characteristics of these structures.

(iii) Explain how vestigial organs give an idea about evolution. **[2]**

(iv) What are the age restrictions for marriage for boys and girls in India. **[2]**

(v) The diagram given below are cross-section of blood vessels; **[3]**



a. Identify the blood vessel A, B and C.

b. Name the parts labelled 1 to 3.

c. In which of the above vessels does the exchange of gases actually takes place.

8. **Question 8** **[10]**

(i) Briefly explain the term plasmolysis. **[1]**

(ii) Mention the following. **[2]**

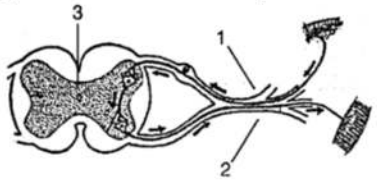
i. Average lifespan of RBCs.

ii. The two major categories of WBCs.

iii. Blood cells involved in leukaemia.

(iii) Is it possible that lake can achieve at that situation that it eventually dries up to form land? If yes, then how? Please explain. **[2]**

(iv) The diagram given below shows the internal structure of a spinal cord depicting a phenomenon. Study the diagram and answer the questions **[3]**



a. Name the phenomenon that is depicted in the diagram. Define the phenomenon.

b. Give the technical term for the points of contact between the two nerve cells.

c. Name the parts numbered 1, 2, and 3.

Solution

Section A

1. Question 1: Choose the correct answers to the questions from the given options. (Do not copy the question, write the correct answers only.)

(i) **(c)** dorsiventral leaf

Explanation: {

dorsiventral leaf

(ii) **(c)** Egg yolks

Explanation: {

Egg yolk contains a lampbrush chromosome where two homologous chromosomes with several chiasmata with several loops in the chromatic region are found. They are also called giant chromosomes.

(iii) **(b)** A layer of specialised neuroglia around myelin sheath of nerve fibres

Explanation: {

A layer of specialised neuroglia around the myelin sheath of nerve fibres is neurilemma.

(iv) **(d)** DDT

Explanation: {

DDT

(v) **(c)** 0.8 second

Explanation: {

0.8 second

(vi) **(a)** Both A and R are true and R is the correct explanation of A.

Explanation: {

It is necessary to have all three at the same time for ozone layer to deplete. Thus both assertion and reason are true and reason is the correct explanation of the assertion.

(vii) **(b)** Condoms

Explanation: {

Condoms provide a barrier while sexual intercorse.

(viii) **(b)** plasma contains proteins

Explanation: {

plasma contains proteins

(ix) **(d)** activate chlorophyll

Explanation: {

activate chlorophyll

(x) **(c)** testosteron

Explanation: {

The testes synthesize: testosterone, needed for the development and maintenance of many physiological functions; and sperm, needed for male fertility.

(xi) **(d)** DNA

Explanation: {

DNA

(xii) **(a)** Pituitary

Explanation: {

Pituitary

(xiii) **(a)** phosphorus

Explanation: {

phosphorus

(xiv) **(a)** carboxylation

Explanation: {

carboxylation

(xv) **(a)** Cornea and Lens

Explanation: {

Aqueous humour is the liquid that is present between **eye lens and cornea**.

2. Question 2

(i) Name the following:

i.

ii. 1. Lenticel

iii. 1. Cuticle

iv. 1. Thyroxine

v. 1. Tropic hormones

2. Tropic

(ii) Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence beginning with the term that is underlined.

i. The logical sequence is ovary, oviduct, uterus, cervix and vagina.

ii. Conjunctiva, Pupil, Aqueous Humor, Vitreous Humor, Yellow Spot

iii. Free movement of solutes, in and out of the cell takes place across the cell wall.

iv. The first process by which water gets into the seed coat during germination is imbibiton.

v. Guanine

(iii) Fill in the blanks with suitable words:

i. (i) follicle, (ii) graafian, (iii) ovulation, (iv) fallopian tube/oviduct/uterine tube, (v) implantation

(iv) Choose the odd one out from the following terms and name the category to which the others belong:

i. **Odd term -** Uterus, a part of reproductive system.
Category - Organs of excretory system

ii. **Odd term** - Cortisone
Category - Pituitary hormone.

iii. **Odd term** - Pepsin
Category - Hormones

iv. Odd term- Styrofoam is non-biodegradable, pollutant
Category- Biodegradable pollutants.

v. **Odd term:** Iodine
Category: Disinfectants

(v) Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs.

i. (a) - (iii), (b) - (iv), (c) - (v), (d) - (ii)

Section B

3. Question 3

(i) X^hY-Haemophilic son
X^hX-Carrier daughter

(ii) i. Monohybrid cross is the inheritance of one pair of contrasting characters.

ii. Gene: Mendel presumed that a character is determined by a pair of factors present in each cell of an individual. These are known as genes in modern genetics.

iii. Phenotype are the physical or observable characteristics of an organism which are genetically controlled.

(iii) In oocytes of some vertebrates, diplotene can last for months or years.

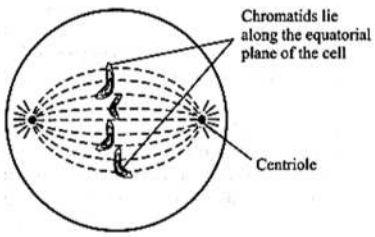
i. Lampbrush chromosomes or diplotene chromosomes are found in the diplotene stage of most animal oocytes of frog or amphibians.

ii. Lampbrush chromosomes are observed in meiotic prophase. These chromosomes become normal after growth and thus completing the cell cycle.

(iv)For each gene corresponding to X-linked traits, females always have two alleles since they have two X-chromosomes.

Males only have one allele of genes related to X-linked traits, since they have only one X-chromosome.

(v) Metaphase stage of mitosis in animal cell is given below:



4. Question 4

(i) Holding the eye (operative) lens in position.

(ii) i. The membranous labyrinth of inner ear is filled with a fluid called endolymph. The coiled portion of the labyrinth is called cochlea.

ii. Organ of Corti is a structure located on the basilar membrane of inner ear, which contains hair cells that act as auditory receptors.

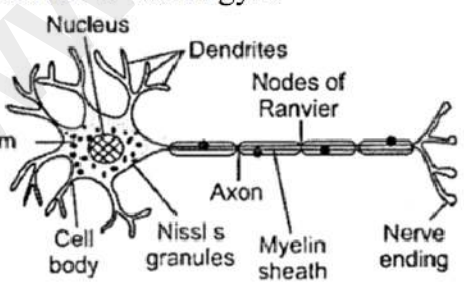
(iii) i. Suspensory ligaments hold lens in position.

ii. Semicircular canals balances the body.

(iv)The cortex of the cerebrum is covered by a number of small, deep and shallow folds called sulci whereas, the convolutions of the brain, i.e. larger grooves (folds) that cover the cortex of the cerebrum is called gyri.

(v)

i.



Structure of a typical neuron

5. Question 5

(i) Dark reaction occurs in day and night both. It's name dark reaction is given because it does not require light. Thus, it is also known as light-independent reaction.

(ii) Chlorophyll has various pigments like a and b. These pigments have a tendency to absorb different light or different wavelengths. Thus, this characteristic feature of various pigments of chlorophyll makes them most effective for photosynthesis.

(iii) Carboxylation is the most crucial step of the Calvin cycle, where CO is utilised for the carboxylation of RuBisCO. This reaction is catalysed by the enzyme RuBP carboxylase which results in the formation of 2 molecules of 3PGA. Since, this enzyme also has an oxygenation activity, it would be more correct to call it RuBP carboxylase-oxygenase or RubBisCO.

(iv) The opening and closing of stomata are controlled by turgor changes in the guard cells. The inner concave walls of the guard cells are thick than their outer walls. Due to the absorption of water, the guard cells become turgid. Their inner walls are pulled apart by their outer wall. The gap between the guard cells becomes wider. Thus, the stomata are open by guard cell. When guard cells are flaccid due to loss of water, the outer walls are not stretched, and their inner walls are not pulled apart decreasing the gap between the guard cells. Thus, the stomata close.

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

b. Iodine solution is used to test for the presence of starch in the leaf.

c. $6CO_2 + 12H_2O \xrightarrow{Sunlight,\ chlorophyll} C_6H_{12}O_6 + 6H_2O + 6O_2 \uparrow$

6. Question 6

(i) Adenine is an example of nitrogen base found in DNA.

(ii) i. Male bees, wasps and ants are haploid organisms, because they are produced from unfertilized eggs.

ii. Synergids and antipodal cells in the ovule don't undergo cell division.

(iii) a. The tropical movement are phototropism by shoots and geotropism by roots.

b. Light is the stimulus that made the shoot bend towards the window.

c. Auxin causes the above effect.

7. Question 7

(i) Alfred Wallace. He worked in Malay Archepelago.

(ii) i. These structure are called vestigial organs.

ii. These are present in reduced or ruminent form in human body. They do not perform any function.

(iii)Those organs, which no longer have a function in our body are known as vestigial organs. These organs have reduced structurally as well as functionally. It appears that these organs were once well-developed and functional in ancestors and later on due to their less use they become reduced, e.g. vermiform appendix in man is reduced and functionless while in herbivores vermiform appendix along with caecum is used for digestion of cellulose. It gives an idea that human had herbivorous food habit and cellulose containing materials were major part of their food.

(iv)Age restriction for boys is 21 years and girls is 18 years in India.

(v) a. The name of blood vessels labelled A, B and C are as follows:

A - Artery

B - Vein

C - Capillary

b. The parts labelled 1 to 3 are as follows:

1 - Connective tissue/ Tunica externa

2 - Lumen

3 - Muscular tissue/ Tunica Media

c. In capillary exchange of gases take place.

8. Question 8

(i) Plasmolysis is the phenomena of contraction of cytoplasm from the cell wall.

(ii) i. 120 days (approximately).

ii. Granulocytes and agranulocytes.

iii. WBCs.

(iii)Yes, the natural ageing of lake occurs due to nutrient enrichment of its water. This phenomenon is known as eutrophication. The fertility of lake increases steadily and slowly due to nutrients. Thus, over the centuries, the organic debris of aquatic organisms piles up and makes lake shallower, marshy and eventually dry to form land.

(iv)a. The given figure shows the phenomenon of reflex action. It is an involuntary or instantaneous reaction in response to a stimulus, e.g. coughing, blinking of eyes, sneezing, etc.

b. The technical term for the points of contact between the two nerve cells is called synapse.

c. Names of the parts numbered 1, 2 and 3 are:

1. Sensory neuron,

2. Motor neuron

3. Grey matter