ICSE Board
Class X Biology
Sample Paper – 9 Solution

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

SECTION-I

Answer 1

(a)
(i) Hepatic artery
(ii) Carbon dioxide
(iii) Photolysis of water
(iv) Isotonic solution
(v) Uterus

(b)
(i) False. A concave lens is used for correcting myopia.
(ii) True.
(iii) True.
(iv) False. Cuticular transpiration occurs in herbs.
(v) True.

(c)
(i) Lymph
(ii) Reverse osmosis
(iii) Anaphase
(iv) Homozygous
(v) Fraternal twins

(d)

SET	ODD TERM	CATEGORY
i. Pons, Cerebrum, Cerebellum, Cochlea	Cochlea	Parts of the brain
ii. Tympanum, Macula, Cochlea, Utriculus	Macula	Structures present in the ear
iii. Thyroid, Thyroxine, Pancreas, Adrenal gland	Thyroxine	Endocrine glands
iv. Receptor, Sensory nerve, Cerebellum, Effector organ	Cerebellum	Form the reflex arc
v. Leptotene, Metaphase, Anaphase, Telophase	Leptotene	Stages of mitosis

(e)

	Location	Function
Cerebellum	In the brain	It maintains the balance of the body and coordinates muscular activity.
Cochlea	Present in the internal ear	It possesses the organ of Corti which helps in hearing.
Ear ossicles	In the middle ear	They receive vibrations from the eardrum and transmit the magnified vibrations to the oval window.
Yellow spot	Back of the eye, at the centre of the horizontal axis of the eyeball	It is the region of best vision.
Eustachian tube	In the middle ear	It equalizes air pressure on either side of the eardrum allowing it to vibrate freely.

(f)

(i) 1. Spinal cord
2. Grey matter
3. White matter
4. Central canal

(ii) In the brain, the cytons of the neurons are outside (white matter) and the axons are inside (grey matter). In the spinal cord, the cytons are inside (grey matter) and the axons are outside (white matter).

(g)

(i) Testis and production of male gametes or sperms.
(ii) Optic nerve and transfer of impulses from the human eye to the brain.
(iii) Palisade cells of the leaf and photosynthesis.
(iv) Phloem and translocation of food.
(v) Oviduct and site of fertilisation in the human female.

(h)

Description	Structure	Location
(i) The gland which secretes thyroxine	Thyroid	Located in front of the neck just below the larynx.
(ii) The site of sharpest vision	Fovea or yellow spot	Located in the retina at the centre on the horizontal axis of the eyeball.
(iii) The structure through which guttation occurs	Hydathodes	Special tissues present on the tips and margins of leaves
(iv) The photoreceptor cells which are sensitive to colour	Cones	Located in the retina
(v) The chemical which helps in the transmission of impulses	Neurotransmitter (Acetylcholine)	Present in the axon bulbs that are located at the axon endings.

SECTION-II

Answer 2

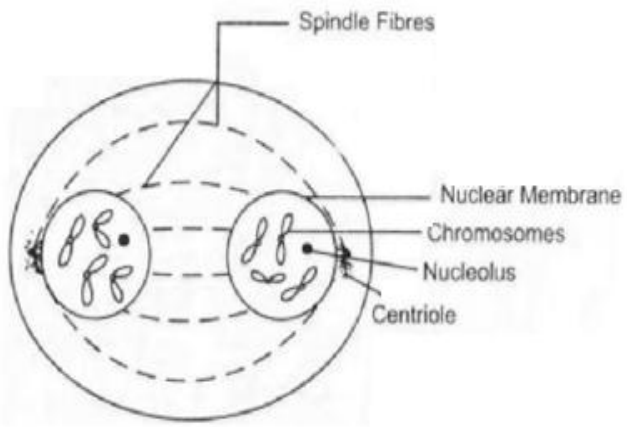
(a)

(i) Anaphase of mitosis is shown in the given figure because the chromatids are moving towards the opposite poles.

(ii) 1. Centriole
2. Spindle fibres
3. Chromatids

(iii) The chromosome number of the cell is four.

(iv) Telophase is the mitotic stage that comes after anaphase.



(b)

Condition	Hormone
Diabetes mellitus	Insulin
Growth of beards in women	Cortisone (androgen)
Myxoedema	Thyroxine
Gigantism	Growth hormone (GH)
Exophthalmic goitre	Thyroxine

Answer 3

(a)

(i) Difference between myopia and hypermetropia on the basis of cause of the defect.

Myopia	Hypermetropia
The eye ball lengthens from front to back.	The eye ball shortens from front to back.

(ii) Difference between cerebrum and spinal cord on the basis of the arrangement of the cytons and axons of the neuron.

Cerebrum	Spinal Cord
The cytons of the neurons lie in the outer region and axons lie in the inner region.	The cytons of the neurons lie in the inner region and axons lie in the outer region.

(iii) Difference between genotype and phenotype on the basis of their definition.

Genotype	Phenotype
Genotype is the genetic constitution of an organism.	Phenotype are the observable or visible characteristics controlled by genes.

(iv) Difference between karyokinesis and cytokinesis on the basis of the explanation of the term.

Karyokinesis	Cytokinesis
Karyokinesis is the division of the nucleus during cell division.	Cytokinesis is the division of the cytoplasm during cell division.

(v) Difference between the light reaction and the dark reaction on the basis of the site of occurrence.

Light reaction	Dark reaction
The light reaction occurs in the grana of the chloroplast.	The dark reaction occurs in the stroma of chloroplast.

(b)

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

(ii) In the dark, the iris is wide open to let in more light. The pigment visual purple is built up in large amounts. As we come out into the bright light, the visual purple is bleached and the iris muscles contract to diminish the pupil. Till this happens, one feels blinded in light.

(iii) On a bright sunny day, the leaves of certain plants roll up to decrease the surface area of the leaves. This reduces transpiration in leaves, helping them to conserve more water.

(iv) Alcohol affects the cerebellum which coordinates muscular activities. Due to alcohol consumption, the cerebellum is not able to coordinate muscular movements properly. Therefore, an alcoholic person walks unsteadily when drunk.

(v) At night, photosynthesis does not take place. So, plants do not absorb carbon dioxide and release oxygen. Instead, at night, respiration occurs in plants during which they release carbon dioxide into the atmosphere. This increases the concentration of carbon dioxide in the surrounding air which is harmful. Therefore, sleeping under a tree at night is not advisable.

Answer 4

(a)

(i) The physiological process being studied is transpiration.

(ii) Transpiration is the loss of water in the form of water vapour from the aerial parts of the plant.

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

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

(v) Adaptations of plants to overcome transpiration:

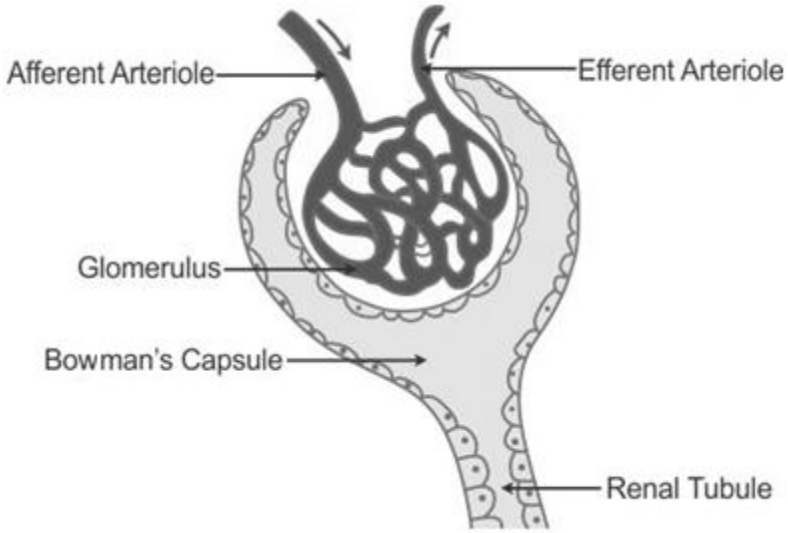
1. Presence of sunken stomata, e.g., *Nerium.*
2. Rolled or folded leaves so as to reduce the exposed surface area for transpiration.
3. Leaves modified into spines, e.g., Cactus.

(b)

No.	Glands	Hormones	Functions	Diseases
(i)	Pituitary	(9) Growth hormone	(1) Maintains normal growth of the body	Gigantism (hypersecretion) Dwarfism (hyposecretion)
(ii)	(2) Thyroid	Thyroxine	(3) Regulates basal metabolic rate	Cretinism, Exophthalmic goitre
(iii)	Pancreas	(4) Insulin	Converts glucose to glycogen	(10) Diabetes mellitus (hyposecretion)
(iv)	Adrenal	(5) Glucocorticoids	Control of carbohydrate and protein metabolism	(8) Addison's disease (hyposecretion)
(v)	Adrenal	(6) Mineralocorticoids	(7) Controls mineral metabolism	Cushing's syndrome (hypersecretion)

Answer 5

(a) Malpighian corpuscle:



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 enters the Bowman's capsule. The fluid entering the renal tubule is called the glomerular filtrate.

(b)

(i) Meninges
(ii) Blind spot
(iii) Parthenocarpy
(iv) Guttation
(v) Parturition
(vi) Phytohormones
(vii) Interstitial cells/Leydig cells
(viii) Stroma
(ix) Carboxyhaemoglobin
(x) Organ of Corti (sense cells)

Answer 6

(a)

(i) 1. **Monohybrid cross:** A cross in which only one pair of contrasting characters is considered is called a monohybrid cross.

2. **Gene:** A gene is a specific sequence of nucleotides on a chromosome that encodes for a particular protein which is expressed in the form of some special feature of the body.

3. **Phenotype:** Phenotype is the observable or visible physical characteristics expressed by the genes in an offspring.

(ii) Colour blindness and haemophilia are sex-linked diseases in males.

(iii) Mendel's law of segregation: According to the law of segregation, the two members of a pair of factors separate during gamete formation. They do not mix or blend with each other but separate into different gametes.

(b)

(i) A - Semicircular canal
B – Utriculus
C – Sacculus
D - Cochlea

(ii) The optic nerve is responsible for transmitting impulses to the brain.

(iii)
1. Static equilibrium: sacculus and utriculus
2. Dynamic equilibrium: semicircular canal
3. Hearing: cochlea

(iv) Sense cells or organs of Corti are the audio receptor cells which pick up vibrations.

(v) Endolymph is the fluid present in the inner ear.

Answer 7

(a)

(i) In the given diagram, the roots show positive geotropism while the stem shows positive phototropism.

(ii) Neo-Darwinism was able to explain the sources of variation which Darwin's theory of Natural Selection failed to explain.

(iii) Differences between Lamarck's theory and Darwin's theory of evolution: (Any two)

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

(b)

(i) Hypotonic solution

(ii) Turgidity

(iii) 1. Cell wall
2. Cell membrane
3. Chloroplasts
4. Vacuole
5. Nucleus

(iv) Significance of turgidity in plants:
1. Turgidity provides rigidity to the plant tissues.
2. Turgidity of the guard cells helps in the regulation of the opening and closing of stomata.