

**ICSE Board
Class X Biology
Sample Paper – 8 Solution**

Time: 2 hrs

Total Marks: 80

SECTION-I

Answer 1

(a)

- (i) Auricular systole
- (ii) Glucose
- (iii) ATP (Adenosine triphosphate)
- (iv) Turgid cell
- (v) Gestation

(b)

- (i) True.
- (ii) False. Pituitary gland is called the master gland.
- (iii) False. Vasectomy is the surgical method of sterilisation in males.
- (iv) True.
- (v) True.

(c)

- (i) Diastole
- (ii) Industrial melanism
- (iii) Karyokinesis
- (iv) Phenotype
- (v) Amnion

(d)

SET	ODD TERM	CATEGORY
i. Blinking, Knitting, Crying, Blushing	Knitting	Natural reflexes
ii. Fovea, Iris, Pupil, Pons	Pons	Parts of the eye
iii. Prostate gland, Seminal vesicle, Cowper's gland, Adrenal gland	Adrenal gland	Accessory glands of the human male reproductive system
iv. Stomata, Cuticle, Lenticel, Hydathode	Hydathode	Parts of the plant responsible for transpiration
v. AIDS, Colour blindness, Syphilis, Gonorrhoea	Colour blindness	Sexually transmitted diseases

(e)

- (i) The yellow spot is found in the eye.
- (ii) The malfunctioning of the thyroid gland in infants causes cretinism.
- (iii) Diaphragm is a mechanical device that is fitted on the cervix to control child birth.
- (iv) In flowering plants, food is transported in the form of sucrose.
- (v) Sperms are produced in the seminiferous tubules.

(f)

- (i) **Alleles:** The alternative forms of a gene occupying the same position on homologous chromosomes and affecting the same characteristics but in different ways are called alleles.
- (ii) **Isotonic solution:** The solution whose concentration is equal to the concentration of cell sap is called an isotonic solution. Here, the concentration of water molecules and the solute is equal on either side of the membrane.
- (iii) **Speciation:** Origin of new species by gradual modification is called speciation.
- (iv) **Parthenocarpy:** Development of fruits without fertilisation is called parthenocarpy.
- (v) **Tropism:** Movement of plant parts in direct response to external stimuli in which the direction of the response is related to the direction of the stimulus is called tropism.

(g)

- (i) Sexually transmitted diseases: syphilis, gonorrhoea.
- (ii) Vestigial organs: wisdom teeth, vermiform appendix
- (iii) Bones in the human ear: incus, stapes.
- (iv) Methods of absorption by roots: diffusion, osmosis.
- (v) Eye defects: myopia, hypermetropia.

(h)

- (i)
 - 1. Afferent arteriole
 - 2. Efferent arteriole
 - 3. Glomerulus
 - 4. Bowman's capsule
- (ii) The lumen of the afferent arteriole is wider than the lumen of the efferent arteriole.
- (iii) Ultrafiltration
- (iv) Glomerular filtrate

SECTION-II

Answer 2

(a)

- (i) During the hot summer months, the rate of transpiration exceeds the rate of absorption of water by the roots. As a result, the cells lose their turgidity. Therefore, during the hot summer months, the leaves of herbaceous plants wilt at noon.
- (ii) Insulin is responsible for increasing the cellular consumption of glucose which helps to maintain the blood glucose level. In diabetic patients, the β -cells of the pancreas are unable to produce sufficient insulin due to which the blood glucose level increases above the normal range. To compensate for the insufficient secretion by the pancreas, diabetic patients are treated with insulin.
- (iii) Amniocentesis can be used to detect the sex of the foetus so that the female foetus can be selectively aborted.
- (iv) Ethylene is the only gaseous hormone which is produced in fruits and remains in the same fruit. Therefore unlike other hormones, its site of synthesis and site of action are not different.
- (v) During meiosis I, the chromosomes of the parent cell are distributed in such a way that each daughter cell receives half the number of chromosomes of that of the parent cell. Therefore, meiosis I is considered as a reductional division.

(b)

- (i) Importance of turgidity in plants:
 1. It provides rigidity to the soft tissues of the plant.
 2. Turgidity in the root cells builds up root pressure which helps to absorb more water.
- (ii) **Mortality:** Mortality is the number of deaths per 1000 people of the population per year.
Natality: Natalty is the number of births per 1000 people of the population per year.
- (iii) Root pressure is the pressure developed in the cortical cells of the root due to absorption of water by the root hair cells, which forces the cell sap upwards in the xylem.
- (iv) **Osmosis:** Osmosis is the movement of water/solvent molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane.
- (v) **Guttation:** When root pressure is high and transpiration is low, the water is forced out through special openings on the leaf called hydathodes in the form of water drops. This process is called guttation.

Answer 3

(a)

- (i) The blood vessel shown in figure A is a capillary.
- (ii) Characteristics of a capillary:
 1. It is a narrow tube.
 2. Its wall is made up of squamous epithelium.
- (iii) Red blood cells and white blood cells are the blood cells shown in figure A.
- (iv) Step by step events shown in the three figures:

Figure A – The WBC squeezes out of the walls of the capillary into the tissue.

Figure B – The WBC extends its pseudopodia around the germs.

Figure C – The WBC engulfs the germ and destroys it.
- (v) The figures collectively depict the phenomenon of diapedesis and phagocytosis.

(b)

- (i) Difference between chromosome and centrosome on the basis of their location.

Chromosome	Centrosome
Chromosomes are present in the nucleus of the cell.	Centrosome is present in the cytoplasm near the nucleus of the cell.

- (ii) Difference between turgidity and flaccidity on the basis of the state of the cell.

Turgidity	Flaccidity
The cell is fully distended and turgid.	The cell content shrinks and the cell is in a plasmolysed state.

- (iii) Difference between transpiration and guttation on the basis of structures responsible.

Transpiration	Guttation
Transpiration occurs through stomata.	Guttation occurs through hydathodes.

- (iv) Difference between birth rate and death rate on the basis of the definition.

Birth rate	Death rate
Birth rate is the number of live births per 1000 of the population per year.	Death rate is the number of deaths per 1000 of the population per year.

- (v) Difference between auditory nerve and optic nerve on the basis of function.

Auditory nerve	Optic nerve
The auditory nerve transmits impulses from the ear to the brain.	The optic nerve transmits impulses from the eye to the brain.

Answer 4**(a)**

- (i) Adrenal gland.
- (ii) The adrenal gland is situated like a cap on the upper side of the kidney.
- (iii) The adrenal gland produces two hormones, adrenaline and glucocorticoids.
- (iv) Adrenaline: It prepares the body to meet emergency situations, for fight, i.e. to face dangers or for flight, i.e. to run away from danger.
Glucocorticoids: They regulate carbohydrate, fat and protein metabolism.
- (v) 1 - Adrenal cortex
2 - Adrenal medulla

(b)

- (i) Commercial applications of gibberellins:
 - To increase the length of grapes, elongate apples and improve their shape.
 - To speed up the malting process in brewing industry.
- (ii) The three bony structures present in the middle ear are called ear ossicles. They are malleus, incus and stapes. The ear ossicles receive vibrations from the ear drum. Malleus and incus magnify the vibrations of the third ear ossicle, the stapes. The magnified vibrations are then transmitted further to the oval window.
- (iii) Peripheral nervous system includes nerves which carry impulses to and from the central nervous system. It is divided into somatic nervous system and autonomic nervous system.
- (iv) The process of squeezing out of WBCs through the walls of the capillaries is called diapedesis.

Answer 5

(a)

	Location	Function
(i) Corpus callosum	Located between the two cerebral hemispheres.	Connects the two cerebral hemispheres and transfers information from one hemisphere to the other.
(ii) Meninges	Three outer coverings of the brain.	Protects the brain from mechanical injuries and jerks.
(iii) Bicuspid valve	Located between the left atrium and the left ventricle.	Prevents the backflow of blood from the left ventricle into the left atrium.
(iv) Genes	Located on the chromosomes.	Transfer genetic information from the parents to the offspring.
(v) Thylakoids	Embedded in the stroma, i.e., the ground substance of the chloroplast.	Chlorophyll present in the thylakoids traps light energy during photosynthesis. Hence, it is the site of the light dependent reaction.

(b)

- (i) 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 other pair.
- (ii) Haemophilia and colour blindness are two examples of sex-linked inherited diseases. They are caused due to the expression of the recessive genes of these diseases present on the 'X' chromosome.
- (iii) Significance of meiosis:
 - 1. It provides scope for variation in the progeny. It also contributes to evolution.
 - 2. The chromosome number of a species can be kept constant.
- (iv) Advantages of a small family:
 - 1. There is less economic pressure on the parents.
 - 2. Proper education can be given to the children.
 - 3. It increases the standard of living.

Answer 6

(a)

- (i) 1. Umbilical cord
2. Placenta
3. Amniotic fluid
4. Amnion
- (ii) **Placenta (Part 2):** It protects the foetus from any mechanical injury or shock. It also provides nourishment and oxygen to the developing foetus and removes waste products from the developing foetus.
Amniotic fluid (Part 3): It acts as a shock absorber. It protects the foetus from mechanical jerks.
- (iii) The placenta is permeable to respiratory gases. The blood of the embryo comes in close contact with the blood of the mother. The foetal blood contains carbon dioxide and urea excreted by the foetus. This blood flows through the very fine capillaries of the placenta. The capillaries and blood sinuses of the mother are located close to the placenta. The embryo gets its oxygen by diffusion from the mother's blood through the umbilical cord.

(b)

- (i) **Endosmosis:** The movement of water into a cell, when it is placed in a hypotonic solution is called endosmosis.
- (ii) **Placenta:** Placenta is a disc-like structure attached to the uterine wall. It provides nourishment and oxygen to the developing embryo through the umbilical cord.
- (iii) **Ovulation:** The process of rupturing of the Graafian follicle to release the mature ovum is called ovulation.
- (iv) **Corpus luteum:** Corpus luteum is a yellow mass formed after the release of the mature ovum from the Graafian follicle. It secretes female hormones, oestrogen and progesterone.
- (v) **Ultrafiltration:** The filtration of the liquid part of the blood due to pressure created in the glomerulus because of differences in the diameter of the afferent arteriole and the efferent arteriole is called ultrafiltration.

Answer 7

(a)

Description	Type of cell	Location in the body
(i) Living cells without nuclei.	Red blood cells	Found in the blood.
(ii) Cells which are haploid.	Gametes, ovum and sperm	Found in the ovaries and testes respectively.
(iii) Cells that secrete glucagon.	Alpha cells of islets of Langerhans	Found in the pancreas.
(iv) Cells that act as an insulating and a storage layer.	Adipose cells	Found under the skin.
(v) Cells that conduct or transmit impulses.	Neurons	Found in the brain and the spinal cord.

(b)

- (i) Trees interrupt the transmission of sound which is helpful in reducing noise pollution.
- (ii) A sperm contains either an 'X' chromosome or a 'Y' chromosome while the ovum always contains an 'X' chromosome. If a sperm carrying an 'X' chromosome fertilises an ovum which always carries an 'X' chromosome, then the combination of sex chromosomes will be 'XX' and hence, the child born will be a female (girl). If a sperm carrying a 'Y' chromosome fertilises an ovum, then the combination of sex chromosomes will be 'XY' and the child born will be a male (boy). Thus, the sex of a child depends on the type of sperm produced by the male (father).
- (iii) The dog develops conditioned reflexes from previous experiences of observing people kneel down before hitting it. The dog, therefore, runs away if it sees you simply kneeling down from a distance.
- (iv) Haemophilia is a sex-linked disease caused due to the expression of its recessive gene present on the X chromosome. Females have two X chromosomes. So, if one X chromosome receives the recessive gene for haemophilia, its expression is masked by the dominant allele present on the other X chromosome. However, in males there is only one X chromosome. So, if a male receives the X chromosome with the recessive gene for haemophilia, it gets expressed. Therefore, haemophilia is more common in males.
- (v) During meiosis, the original chromosome number of the parent cell is reduced to half and each daughter cell receives half the number of chromosomes of the parents. Therefore, meiosis is called reductional division.