ICSE Board
Class X Biology
Sample Paper – 14 Solution

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

SECTION-I

Answer 1

(a)

(i) Medulla oblongata
(ii) Natural selection
(iii) Photolysis of water
(iv) Acromegaly
(v) Parthenocarpy

(b)

(i) Thermal pollution
(ii) Axons
(iii) Plasmolysis
(iv) Phototropism
(v) Charles Darwin

(c)

(i) **Cro-Magnon** man represents the transition between **Neanderthal** man and modern man.
(ii) ***Hydrilla*** is an aquatic plant which during photosynthesis releases **oxygen**.
(iii) Islets of **Langerhans** are hormone-secreting cells present in the **pancreas**.
(iv) In **phototropism**, shoots are said to be positively **phototropic**.
(v) **Prophase** is the first phase of **karyokinesis** of mitosis.

(d)

(i) Interphase → Prophase → Metaphase → Anaphase → Telophase
(ii) Ovulation → Fertilisation → Implantation → Gestation → Childbirth
(iii) Pinna → Auditory canal → Tympanum → Ear ossicles → Cochlea
(iv) Testis → Sperms → Sperm duct → Semen → Penis
(v) Ovary → Fallopian tube → Uterus → Cervix → Vagina

(e)

(i) True.
(ii) False. Deafness is caused by rupturing of the tympanum.
(iii) False. Transformation of cartilage into bones is called ossification.
(iv) False. Watson and Crick showed the double helical structure of the molecule of DNA.
(v) True.

(f)

	Organ	**Location**
(i)	Palisade cells	Beneath the upper epidermis of the leaf
(ii)	Guard cells	Between epidermal cells in the leaf
(iii)	Iris	In front of the ciliary body in the eyes
(iv)	Eustachian tube	Between the middle ear and the pharynx
(v)	Thyroid gland	Situated on either side of the trachea in front of the larynx

(g)

(i) Stomata
(ii) Testosterone
(iii) Spinal cord
(iv) Water pollution
(v) Labia majora

(h)

(i) 1 → Stoma
2 → Nucleus
3 → Inner thick wall of a guard cell
4 → Outer thin wall of a guard cell
5 → Chloroplast
6 → Subsidiary cell
(ii) The guard cells are in turgid state.
(iii) The turgid state of the guard cells helps in increasing the size of the stoma, i.e. opening the stomata.

SECTION-II

Answer 2

(a)

(i) 1 → Tectorial membrane
2 → Reissner's membrane
3 → Basilar membrane
4 → Organ of Corti
5 → Auditory nerve fibres

(ii) Outer ear and middle ear

(iii) Tectorial membrane: It is a projection which responds to sound. It is present in the central canal in contact with fine hair on sensory cells which together with their supporting cells occupy the space between it and the basilar membrane. At the base of the sensory cells are nerve fibres which join the auditory nerve taking the information to the brain.
Reissner's membrane: It separates the vestibular canal from the central canal. Movement of this membrane due to sound waves causes displacement of endolymph in the central canal bringing about the movement of another membrane, the basilar membrane, which displaces fluid in the tympanic canal.

(iv) This organ, i.e. the ear, is significant in balance and maintenance of posture of the body as the components responsible for this activity are located in this organ.

(b)

(i) Centrifugal cytokinesis: Centrifugal cytokinesis follows the division of the nucleus when the cytoplasm divides by the formation of a cell plate in the centre, which then proceeds outwards.

(ii) Artificial insemination: The introduction of the semen into the genital tract (vagina) of the females by artificial means is called artificial insemination.

(iii) Law of dominance: According to the law of dominance, out of a pair of alleles for contrasting characters brought together in an offspring, one always dominates over the other. The one that is expressed is dominant and the one that remains masked is recessive.

(iv) Seminal vesicles: Seminal vesicles are elongated pouch-like structures between the rectum and the bladder. They secrete viscous fluid which activates the sperms.

(v) Hydrotropism: The movement of plant parts in response to water or moisture is called hydrotropism.

Answer 3

(a)

(i) 1. Upper eyelid
2. Eyelashes
3. Nictitating membrane
4. Cornea
5. Pupil
6. Lower eyelid
7. Eyeball
8. Lacrimal gland

(ii) Part 1 (Upper eyelid): It regularly closes after a short interval to clean the cornea. This process is called blinking.
Part 5 (Pupil): It is an aperture in the centre of the iris which narrows or widens due to contraction and relaxation of the circular and radial muscles of the iris to allow the correct amount of light to enter the eye.

(b)

(i) Pulse rate: When the heart beats, it pumps blood to the arteries which dilate and a wave of dilation spreads through them, which can be felt in the wrist below the base of the thumb. This rhythmic movement of blood through the arteries is called the pulse rate.

(ii) Potometer: A potometer is a device or an instrument that measures the rate of water uptake by a plant. It indirectly measures the rate of transpiration.

(iii) Osmotic pressure: The mechanical pressure that must be applied on a solution to prevent the passage of solvent in the solution through a semi-permeable membrane.

(iv) Chiasma: During pairing of homologous chromosomes, some chromatids remain attached where crossing over takes place. These individual points of attachment are called chiasma.

(v) Haematuria: It is a disorder of the excretory system in which blood passes out through the urine.

Answer 4

(a)

(i) 1. Umbilical cord
2. Placenta
3. Amniotic fluid
4. Mouth of uterus
5. Wall of uterus

(ii) Gestation period (Nine months)

(iii) 280 days

(iv) Function of part 2 (placenta):

- Excretes nitrogenous wastes and carbon dioxide.
- Does not allow passage of germs from the mother to the foetus.

(v) Progesterone

(b)

(i) In human, males have XY sex chromosomes, while females have XX chromosomes. If the male X chromosome fuses with the female X chromosome, a female child is born. If the male Y chromosome fuses with the female X chromosome, a male child is born.

(ii) Xerophytes have a thick cuticle to check the excessive loss of water through transpiration.

(iii) Most green leaves are thin and broad for easy exchange of gases and to receive more sunlight.

(iv) In India, the age restriction for marriage is 18 years for girls and 21 years for boys.

(v) Vestigial organs are organs which have ceased to be of any use to the possessor but still persist generation after generation in a reduced form.

Answer 5

(a)

(i) 1. Eyeball – Camera box
2. Lens - Lens
3. Eyelids – Lens cap
4. Pupil - Aperture
5. Lens muscle – Focusing device

(ii) Similarities between the eye and a photographic camera:

Eye	Photographic camera
Eyeball	Camera box
Lens	Lens
Eyelids	Lens cap
Pupil	Lens opening aperture
Pigmented lining of the wall	Black lining of the box

(iii) Differences between the eye and a photographic camera:

Eye	Photographic camera
Same light-sensitive layer is reused.	The light plate of the film has to be replaced every time while taking a new picture.
Focusing is done by altering the shape of the lens.	Focusing is done by changing the distance between the lens and the sensitive plate.

(b)

(i) Semi-permeable membrane
(ii) Recessive allele
(iii) Optic nerve
(iv) Diapedesis
(v) Meninges
(vi) Chemotropism
(vii) Tropic hormones
(viii) Luteal phase
(ix) Demography
(x) Theory of Natural Selection

Answer 6

(a)

(i) 1. Urinary bladder
2. Urethra
3. Testis
4. Scrotum
5. Epididymis
6. Vas deferens

(ii) Part 3 (Testis) – Production of sperms.
Scrotal sac – Maintains a suitable temperature for the production of sperms and protection of testis.

(iii) Seminal vesicles
Prostate glands
Cowper's glands

(b)

(i) Islets of Langerhans: Pancreas
(ii) Interstitial cells: Testis
(iii) Genes: Chromosomes
(iv) Sunken stomata: *Nerium* leaf
(v) Nissl's granules: Cell body of neurons

Answer 7

(a)

(i) The given stage is Prophase, because the nuclear membrane disappears only during prophase.

(ii) Centrosome

(iii) 1. Centromere
2. Sister chromatids (Duplicated chromosomes)
3. Spindle fibres

(iv) Metaphase. This stage can be identified by the lining of the chromosomes on the equatorial plane of the spindle.

(v) Differences between 'mitosis' and 'meiosis':

Mitosis	Meiosis
1. Two daughter cells are formed.	1. Four daughter cells are formed.
2. Daughter cells have the same number of chromosomes as the parent cell.	2. Daughter cells have half the number of chromosomes as the parent cell.

(b)

(i) Wilted lettuce leaves become crisp if kept in cold water because they regain their turgor pressure.

(ii) It is advisable not to sleep under a tree at night because of harmful animals and the release of carbon dioxide at night.

(iii) A tiger owes its existence to chlorophyll. Green plants prepare their own food with the help of chlorophyll. These green plants are eaten by herbivores, and further, herbivores are eaten by carnivores.

(iv) Some plants show wilting of their leaves during mid-day even when the soil is well-watered as the rate of transpiration is more than the rate of water absorption by roots.

(v) On sprinkling common salt on a lawn, the grass is killed due to plasmolysis of grass cells because of high concentration gradient solution.