

ICSE Board

Class X Biology

Board Paper 2017 (Solution)

SECTION I

Answer 1

(a)

- (i) Osmosis
- (ii) Kidney
- (iii) Concave
- (iv) Oxytocin
- (v) Red Cross

(b)

- (i) D. Refrigeration equipment
(Sources of chlorofluorocarbon are refrigerators, aerosol-sprayers and packing material styrofoam.)
- (ii) A. Antibiotic
(Penicillin was the first antibiotic discovered by Alexander Fleming.)
- (iii) A. Endosmosis
(When a marine fish is placed in tap water which is hypotonic as compared to the fish's body, water will enter the fish's body by endosmosis.)
- (iv) D. Oviduct
(Tubectomy is the ligation of oviducts, i.e. they are cut and tied with nylon thread to close the passage of the ovum.)
- (v) C. DNA
(DNA synthesis occurs during the S-phase of the cell cycle.)

Please note that the information provided in brackets is to help you in your learning. It does not have to be included in your answer.

(c)

- (i) The Graafian follicle after ovulation turns into a hormone-producing tissue called **corpus luteum**.
- (ii) Deafness is caused due to the damage to the **eardrum**.
- (iii) Gyri and sulci are the folds of **cerebrum**.
- (iv) Free movement of solutes in and out of the cell takes place across the **cell wall**.
- (v) The solvent used to dissolve the chlorophyll pigment while testing a leaf for starch is **methyated spirit**.

(d)

- (i) Platelets → Thromboplastin → Thrombin → Fibrinogen → Fibrin
- (ii) Pinna → Malleus → Incus → Stapes → Cochlea
- (iii) Receptor → Sensory neuron → Spinal cord → Motor neuron → Effector
- (iv) Fertilisation → Uterus → Implantation → Gestation → Parturition
- (v) Green leaves → Caterpillar → Frog → Snake → Owl

(e)

- (i) Odd Term – Central canal
Aqueous humour, vitreous humour and iris are parts of the human eye.
- (ii) Odd Term – Lime
Formalin, iodine and DDT are chemical substances.
- (iii) Odd Term – ADH
TSH, ACTH and FSH are secreted by the anterior pituitary gland.
- (iv) Odd Term – RNA
Phosphate, sugar and nitrogenous base form a molecule of nucleotide.
- (v) Odd Term – Bile
Urea, uric acid and ammonia are nitrogenous waste substances.

(f)

- (i) Eye : Optic nerve : : Ear : **Auditory nerve**
- (ii) Cytoplasm : Cytokinesis : : Nucleus : **Karyokinesis**
- (iii) TT : Homozygous : : Tt : **Heterozygous**
- (iv) Foetus : Amnion : : Heart : **Pericardium**
- (v) Adenine : Thymine : : Cytosine : **Guanine**

(g)

Column A	Column B (Answers)
1. Sacculus	Static body balance
2. Birth rate	Natality
3. DNA and histones	Nucleosome
4. Euro norms	Vehicular standards
5. Diabetes mellitus	Hyperglycemia

(h)

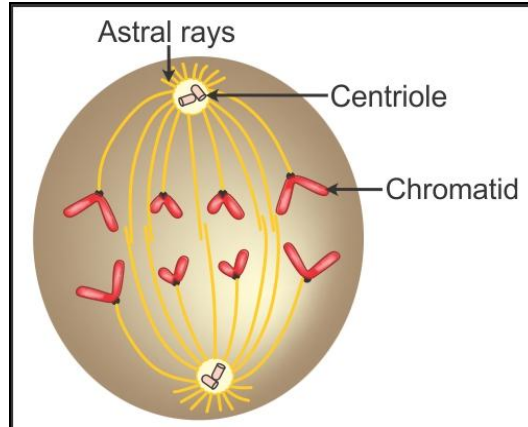
- (i) Thyroid gland
- (ii) Thyroxine regulates the basal metabolism.
- (iii) Iodine is required for the synthesis of thyroxine.
- (iv) Cretinism
- (v) Exophthalmic goitre

SECTION II

Answer 2

(a)

- (i) Telophase
- (ii) 1 – Daughter chromosome, 2 – Nuclear membrane
- (iii) Karyokinesis is the technical term for the division of a nucleus.
- (iv) Anaphase



(v) Meiosis

(b)

(i) Active Transport and Diffusion (Significance in Plants)

Active Transport	Diffusion
Helps in the uptake of ions by roots from the soil	Gas exchange with the environment

(ii) Demography and Population Density (Definition)

Demography	Population Density
Statistical study of human population with reference to size, density and distribution.	Number of individuals per square kilometre at any given time.

(iii) Antibiotic and Antibody (Source)

Antibiotic	Antibody
Fungus	Blood serum

(iv) Renal cortex and Renal medulla (Parts of the nephron present)

Renal Cortex	Renal Medulla
Bowman's capsule, proximal convoluted tubule (PCT), distal convoluted tubule (DCT)	Loop of Henle, collecting duct

(v) NADP and ATP (Expand the abbreviation)

NADP	ATP
Nicotinamide adenine dinucleotide phosphate	Adenosine triphosphate

Answer 3

(a)

- (i) Plasmolysed cell
- (ii) Cell membrane acts as a selectively permeable membrane.
- (iii) 1 – Cell wall, 2 – Space filled with strong sugar solution, 3 – Plasma membrane, 4 – Nucleus
- (iv) If the cell is placed in a hypotonic sugar solution, the cell will be brought to its original condition. This is called deplasmolysis.
- (v) Features present in the plant cell which are not present in the animal cell:
 - Presence of cell wall
 - Ability to shrink the protoplasm and plasmolyse

(b)

- (i) Noise pollution
- (ii) Sources of noise pollution:
 - Use of loudspeakers and musical bands in public places
 - Sounds generated by industrial machines
 - Landing and taking off of aeroplanes, jets and other aircraft
- (iii) Harmful effects of noise pollution on human health:
 - Loud sounds cause damage to the ear drum which can lead to deafness
 - Lowered work efficiency
 - Nervous irritability
- (iv) Any substance which causes pollution is called a pollutant.
- (v) Plastic and radioactive substances are soil pollutants.

Answer 4

(a)

- (i) Photosynthesis
- (ii) Photosynthesis is a physiological process by which plant cells containing chlorophyll produce food in the form of carbohydrates by using carbon dioxide, water and light energy. Oxygen is released as a by-product.
- (iii) In bell jar B, the mouse suffocated and died because it was deprived of oxygen.
- (iv) Photosynthesis can be said to be the food giver for all. Green plants synthesise their food by photosynthesis, and all other organisms are dependent on plants for their food directly or indirectly.
- (v) $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{chlorophyll}]{\text{light energy}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2 \uparrow$

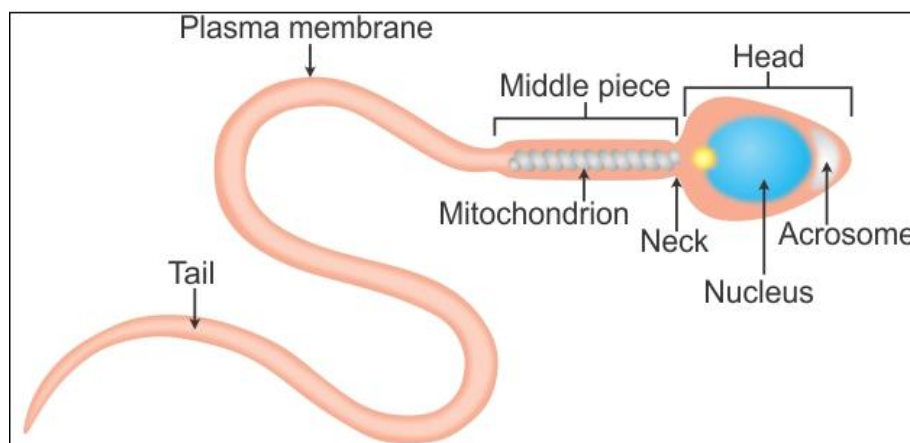
(b)

- (i) **Prostate gland**: Surrounds the urethra and is present at the base of the urinary bladder
- (ii) **Myelin sheath**: Around the axon
- (iii) **Islets of Langerhans**: Scattered in pancreas
- (iv) **Semicircular canals**: Inner ear
- (v) **Eustachian tube**: Between the cavity of the middle ear and throat

Answer 5

(a)

- (i) 1 – Scrotum, 2 – Vas deferens, 3 – Epididymis
- (ii) Sperms are produced in seminiferous tubules.
- (iii) 1 (Scrotum) – Provides lower temperature than the actual body temperature which is required for the production and survival of sperms.
2 (Vas deferens) – Carries sperms from the epididymis to the urethra.
3 (Epididymis) – Sperms mature and are stored.
- (iv) Leydig cells secrete testosterone.
- (v) **Sperm**:



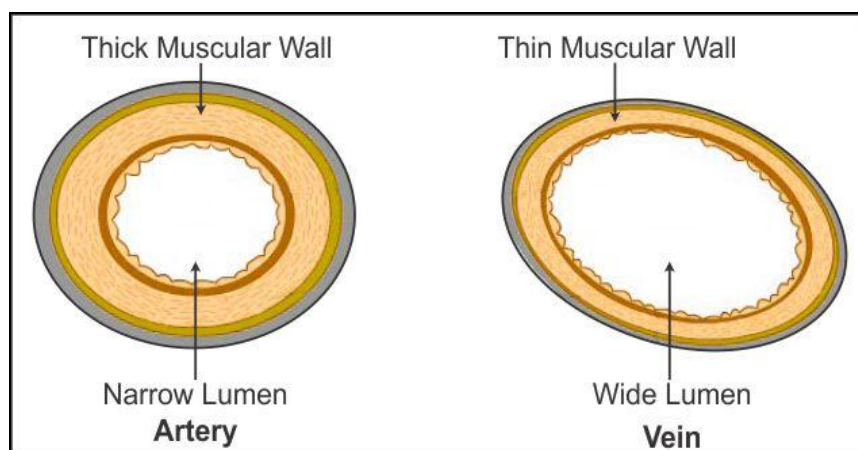
(b)

- (i) Adrenal cortex secretes certain cortical hormones which behave like sex hormones. The enlargement of the adrenal cortex in women results in the increase in secretion of these cortical hormones. Hence, some women have facial hair like beard and moustache.
- (ii) Cutting trees results in an increase in the concentration of carbon dioxide in the atmosphere resulting in global warming. Hence, cutting of trees should be discouraged.
- (iii) Xerophytes are plants growing in dry climate. It is important for them to conserve water. Leaves modified into spines reduce the surface area and thus reduce the rate of transpiration.
- (iv) In winter, our body does not need to store much water because the outside temperatures are low. Also, very less amount of water is lost through perspiration during winter. Hence, urination is more frequent in winter than in summer.
- (v) The right ventricle pumps deoxygenated blood only to the lungs, while the left ventricle pumps oxygenated blood to the longest distance in the body, and hence, it has thicker walls than the right ventricle.

Answer 6

(a)

- (i) Ventricles are in diastolic phase. The arrows indicate blood entering the ventricles. During a ventricular diastole, the valves between atria and ventricles open which allow the entry of blood into the ventricles.
- (ii) 1 – Pulmonary artery, 2 – Pulmonary veins
- (iii) Closing of the bicuspid and tricuspid valves causes the 'LUBB' sound, and the closing of semilunar valves causes the 'DUP' sound.
- (iv) Coronary artery supplies oxygenated blood to the heart muscles.
- (v) **Cross-section of an artery and a vein:**



(b)

- (i) Innate immunity
- (ii) Recessive gene
- (iii) Seminal vesicles
- (iv) Ganong's photometer
- (v) Fraternal twins
- (vi) Homologous chromosomes
- (vii) Antiseptic
- (viii) Biomedical waste
- (ix) Lysozymes
- (x) Red blood cell

Answer 7

(a)

- (i) Phenotype of F₁ generation plants: Axial flowers

Genotype of F₁ generation plants: Aa

- (ii) Punnett square board to represent gametes and offspring when both parent plants are heterozygous for axial flowers (Aa).

	A	a
A	AA	Aa
a	Aa	aa

- (iii) **Phenotypic ratio for the above cross – 3 : 1** (3 pea plants with axial flowers : 1 pea plant with terminal flowers)

Genotypic ratio for the above cross – 1 : 2 : 1 (1 homozygous plant with axial flowers : 2 heterozygous plants with axial flowers : 1 homozygous plant with terminal flowers)

- (iv) **Mendel's Law of Dominance:**

Of a pair of contrasting characters present together, only one can express itself, while the other remains suppressed. The one which is expressed is the dominant and the one which is not expressed is the recessive.

- (v) **Genetic disorders commonly seen in human males:**

Haemophilia
Colour blindness

(b)

- (i) A – Cerebrum, B – Cerebellum, C – Medulla oblongata
- (ii) **A (Cerebrum)** – It is the site of intelligence, memory and consciousness.
B (Cerebellum) – Coordinates muscular activity and hence helps in balancing the body.
- (iii) Neurons are the structural and functional units of the brain.
In A (Cerebrum), the outer portion contains cell bodies and the inner portion contains the axons of the neurons.
In C (Medulla oblongata), the outer portion contains axons and the inner portion contains the cell bodies of the neurons.
- (iv) Meningitis
- (v) Cerebrospinal fluid acts as a cushion and protects the brain from mechanical shocks.