

ICSE QUESTION PAPER

Class X **Biology**

(2017)

General Instructions:

Total Marks: 80

Answers to this paper must be written on the paper provided separately.

*You will **not** be allowed to write during the first **15** minutes.*

This time is to be spent in reading the question paper.

The time given at the head of the paper is the time allowed for writing the answers.

*Attempt **all** questions from **Section I** and **any four** questions from **Section II**.*

The intended marks of questions or parts of questions are given in brackets [].

SECTION I (40 Marks)

*Attempt **all** questions from this Section*

Question 1

- (a) Name the following: [5]
- (i) The process by which root hairs absorb water from the soil.
 - (ii) The organ which produces urea.
 - (iii) The kind of lens required to correct Myopia.
 - (iv) The pituitary hormone which stimulates contraction of uterus during child birth.
 - (v) The international health organisation which educates people in accident prevention.
- (b) Choose the correct answer from each of the four options given below: [5]
- (i) The prime source of chlorofluorocarbons is:
 - A. Vehicular emissions
 - B. Industrial effluents
 - C. Domestic sewage
 - D. Refrigeration equipments

- (ii) Penicillin obtained from a fungus is:
- A. Antibiotic
 - B. Antiseptic
 - C. Antibody
 - D. Antiserum
- (iii) Marine fish when placed in tap water bursts because of:
- A. Endosmosis
 - B. Exosmosis
 - C. Diffusion
 - D. Plasmolysis
- (iv) Surgical method of sterilisation in a woman involves cutting and tying of:
- A. Ureter
 - B. Uterus
 - C. Urethra
 - D. Oviduct
- (v) Synthesis phase in the cell cycle is called so, because of the synthesis of more:
- A. RNA
 - B. RNA and proteins
 - C. DNA
 - D. Glucose

(c) The statements given below are incorrect. Rewrite the correct statement by changing the underlined words of the statements. [5]

- (i) The Graafian follicle, after ovulation turns into a hormone producing issue called Corpus callosum.
- (ii) Deafness is causal due to the rupturing of the Pinna.
- (iii) Gyri and Sulci are the folds of Cerebellum.
- (iv) Free movement of solutes in and out of the cell takes place across the cell membrane.
- (v) The solvent used to dissolve the chlorophyll pigments while testing a leaf for starch is Soda lime.

(d) Given below are sets of five terms each. Rewrite the terms in correct order in a logical sequence.

Example : Large intestine, Stomach, Mouth, Small intestine, Oesophagus.

Answer : Mouth → Oesophagus → Stomach → Small intestine → Large intestine.

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

(e) Choose the ODD one out of the following terms given and name the CATEGORY to which the others belong: [5]

- (i) Aqueous humour, Vitreous humour, Iris, Central canal
- (ii) Formalin, Iodine, DDT, Lime
- (iii) ACTH, TSH, ADH, FSH
- (iv) Phosphate, RNA, Sugar, Nitrogenous base
- (v) Bile, Urea, Uric acid, Ammonia

(f) Given below are groups of terms. In each group the first pair indicates the relationship between the two terms. Rewrite and complete the second pair on a similar basis.

Example : Oxygen : Inspiration : : Carbon dioxide : Expiration

- (i) Eye : Optic nerve : : Ear : _____
- (ii) Cytoplasm : Cytokinesis : : Nucleus : _____
- (iii) TT : Homozygous : : Tt : _____
- (iv) Foetus : Amnion : : Heart _____
- (v) Adenine : Thymine : : Cytosine : _____

- (g) Match the items given in Column A with the most appropriate ones in Column B and rewrite the correct matching pairs.

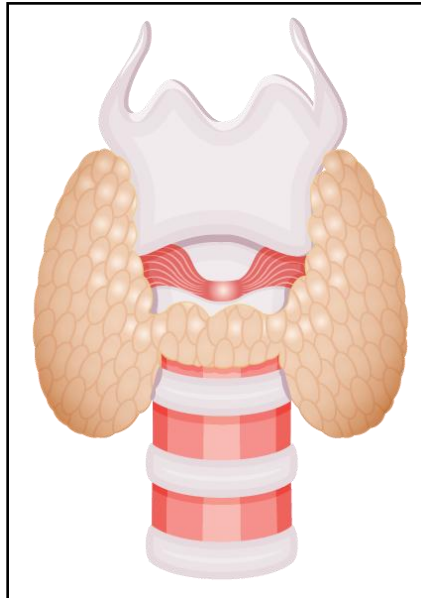
Column A

1. Sacculus
2. Birth rate
3. DNA and histomes
4. Euro norms
5. Diabetes mellitus

Column B

- dynamic body balance
- Hyperglycemia
- Hypoglycemia
- Natality
- static body balance
- vehicular standards
- nucleosome

- (h) The diagram given below represents the location and structure of an endocrine gland. Study the same and answer the questions that follow: [5]



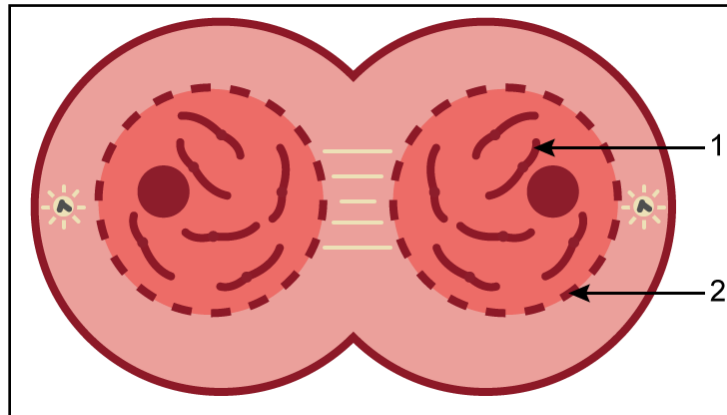
- (i) Name the endocrine gland shown in the diagram.
- (ii) Name the secretion of the gland which regulates basal metabolism.
- (iii) Name the mineral element required for the synthesis of the above mentioned hormone.
- (iv) Name the disease caused due to undersecretion of the above mentioned hormone in children.
- (v) Name the disease caused due to hypersecretion of the above mentioned hormone.

SECTION II (40 Marks)

Attempt any **four** questions from this Section

Question 2

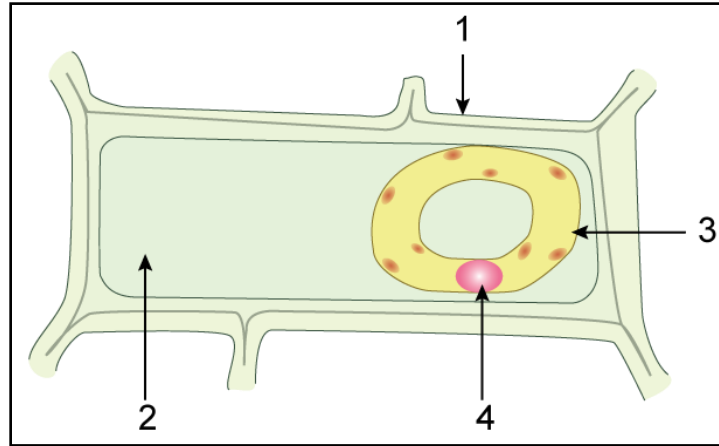
- (a) Study the diagram given below which represents a stage during the mitotic cell division and answer the questions that follow: [5]



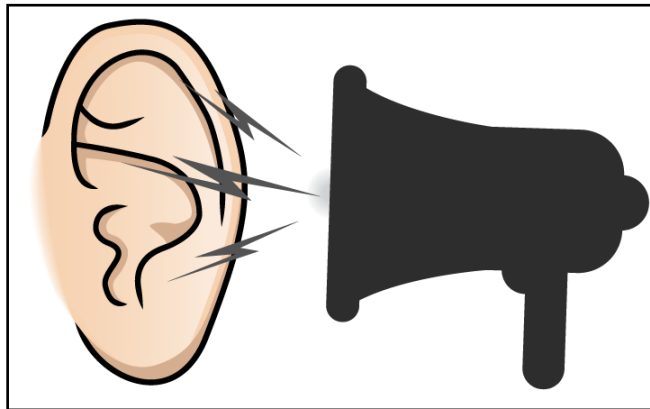
- (i) Identify the stage giving suitable reasons.
- (ii) Name the parts numbered 1 and 2.
- (iii) What is the technical term for the division of nucleus?
- (iv) Mention the stage that comes before the stage shown in the diagram. Draw a neat labelled diagram of the stage mentioned.
- (v) Which is the cell division that results in half the number of chromosomes in daughter cells?
- (b) Differentiate between the following pairs on the basis of what is mentioned in brackets: [5]
- (i) Active Transport and Diffusion [Significance in plants]
- (ii) Demography and Population density [Definition]
- (iii) Antibiotic and Antibody [Source]
- (iv) Renal cortex and Renal medulla [Parts of the nephrons present]
- (v) NADP and ATP [Expand the abbreviation]

Question 3

- (a) The diagram given below represents a plant cell after being placed in a strong sugar solution. Study the diagram and answer the questions that follow: [5]



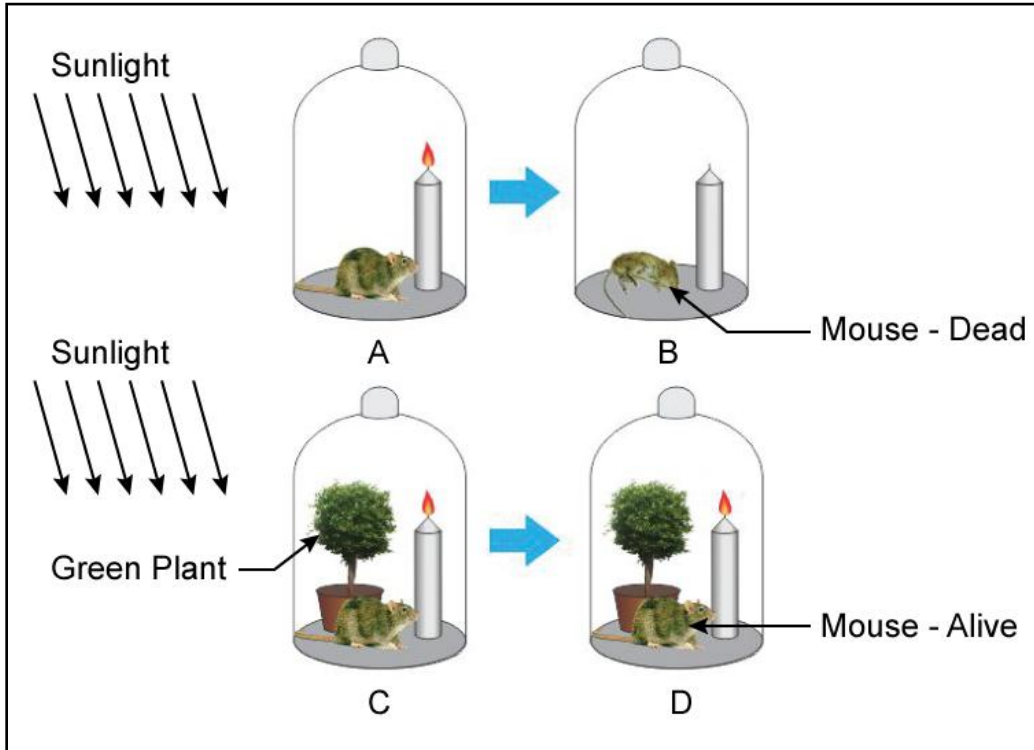
- (i) What is the state of the cell shown in the diagram?
(ii) Name the structure that acts as a selectively permeable membrane.
(iii) Label the parts numbered 1 to 4 in the diagram.
(iv) How can the above cell be brought back to its original condition? Mention the scientific term for the recovery of the cell.
(v) State any two features of the above plant cell which is not present in animal cells.
- (b) Given below is a representation of a kind of pollution. Study the same and answer the questions that follow: [5]



- (i) Name the kind of pollution.
(ii) List any three common sources of this pollution.
(iii) Mention three harmful effects of this pollution on human health.
(iv) Explain the term 'Pollutant'.
(v) Name two soil pollutants

Question 4

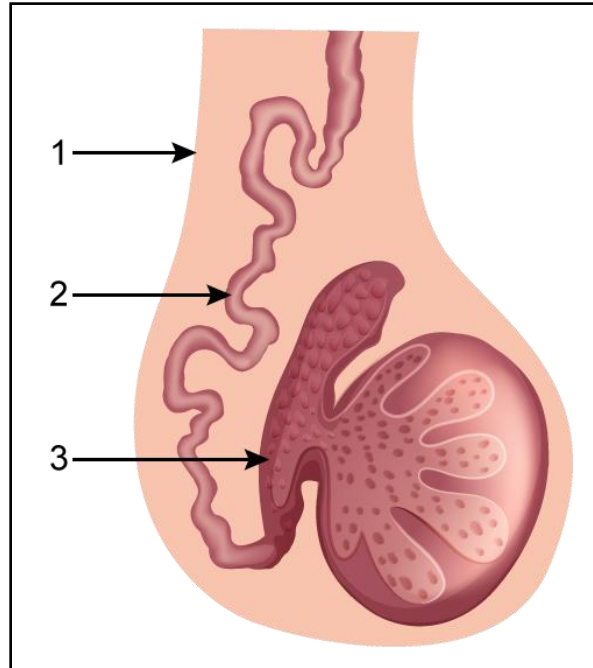
- (a) The diagrams given below represent the relationship between a mouse and a physiological process that occurs in green plants. Study the diagrams and answer the questions that follow: [5]



- (i) Name the physiological process occurring in the green plant that has kept the mouse alive.
 - (ii) Explain the physiological process mentioned above.
 - (iii) Why did the mouse die in bell jar B?
 - (iv) What is the significance of the process as stated in (i) for life on earth?
 - (v) Represent the above mentioned physiological process in the form of a chemical equation.
- (b) Mention the exact location of the following: [5]
- (i) Prostate gland
 - (ii) Myelin sheath
 - (iii) Islets of Langerhans
 - (iv) Semi-circular canals
 - (v) Eustachian tube

Question 5

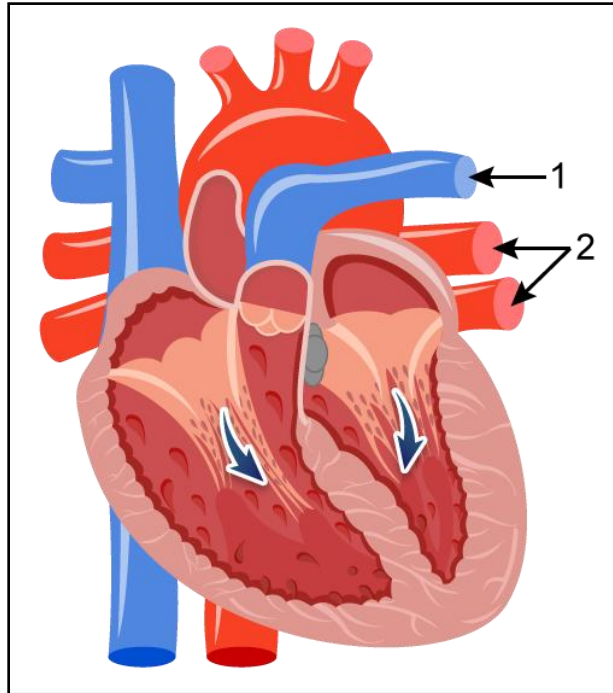
- (a) The diagram shown below is the longitudinal section of a testis of man. Study it carefully and answer the questions that follow: [5]



- (i) Label the parts numbered 1 to 3 in the diagram.
 - (ii) In which part of the testis are the sperms produced?
 - (iii) State the functions of the parts labelled 1 and 3 in the diagram.
 - (iv) Name the cells that secrete Testosterone.
 - (v) Draw a neat, labelled diagram of a sperm.
- (b) Give biological reasons for the following statements: [5]
- (i) Some women have facial hair like beard and moustache.
 - (ii) Cutting of trees should be discouraged.
 - (iii) In some xerophytes leaves are modified into spines.
 - (iv) There is frequent urination in winter than in summer.
 - (v) The left ventricle of the heart has a thicker wall than the right ventricle.

Question 6

- (a) The diagram given below represents a section of the human heart. Answer the questions that follow : [5]

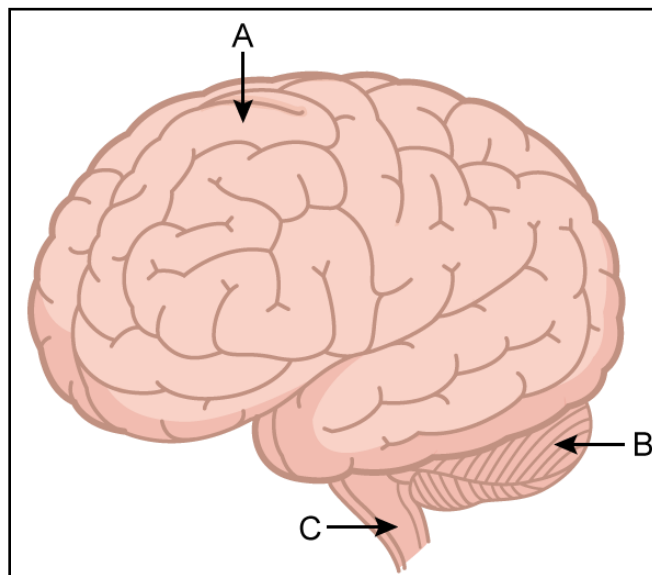


- (i) Which parts of heart are in the diastolic phase? Give a reason to support your answer.
- (ii) Label the parts numbered 1 and 2 in the diagram. What type of blood flows through them?
- (iii) What causes the heart sounds 'LUBB' and 'DUP'?
- (iv) Name the blood vessels that supply oxygenated blood to the heart muscles.
- (v) Draw neat labelled diagrams of a cross section of an artery and a vein.
- (b) Give appropriate **biological/technical** terms for the following: [5]
- (i) The type of immunity that exists in our body due to our genetic makeup.
- (ii) The suppressed allele of a gene.
- (iii) The accessory gland in human males whose secretion activates the sperms.
- (iv) An apparatus that measures the rate of water uptake in a cut shoot due to transpiration.
- (v) The kind of twins formed from two fertilized eggs.

- (vi) A pair of corresponding chromosomes of the same size and shape, one from each parent.
- (vii) The mild chemical substance which when applied on the body kills germs.
- (viii) The type of waste generated in hospitals and pathological laboratories.
- (ix) The antiseptic substance in tears.
- (x) Cellular components of blood containing hemoglobin.

Question 7

- (a) In a homozygous pea plant, axial flowers (A) are dominant over terminal flowers (a). [5]
- (i) What is the phenotype and genotype of the F₁ generation if a plant bearing pure axial flowers is crossed with a plant bearing pure terminal flowers?
 - (ii) Draw a Punnett square board to show the gametes and offsprings when both the parent plants are heterozygous for axial flowers.
 - (iii) What is the phenotypic ratio and genotypic ratio of the above cross shown in (ii)?
 - (iv) State Mendel's Law of Dominance.
 - (v) Name two genetic disorders commonly seen in human males.
- (b) The diagram given below is an external view of the human brain. Study the same and answer the questions that follow : [5]



- (i) Name the parts labelled A, B and C in the diagram.
- (ii) State the main functions of the parts labelled A and B.

- (iii) What are the structural and functional units of the brain? How are the parts of these units arranged in A and C?
- (iv) Mention the collective term for the membranes covering the brain.
- (v) What is the function of Cerebrospinal fluid?

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)

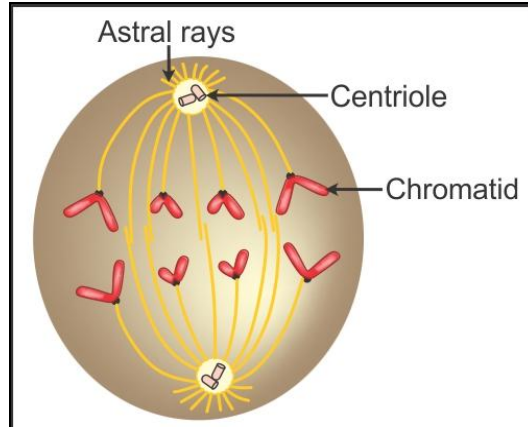
- (i) Thyroid gland
- (ii) Thyroxine regulates the basal metabolism.
- (iii) Iodine is required for the synthesis of thyroxine.
- (iv) Cretinism
- (v) Exophthalmic goitre

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) $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{chlorophyll}]{\text{light energy}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2 \uparrow$

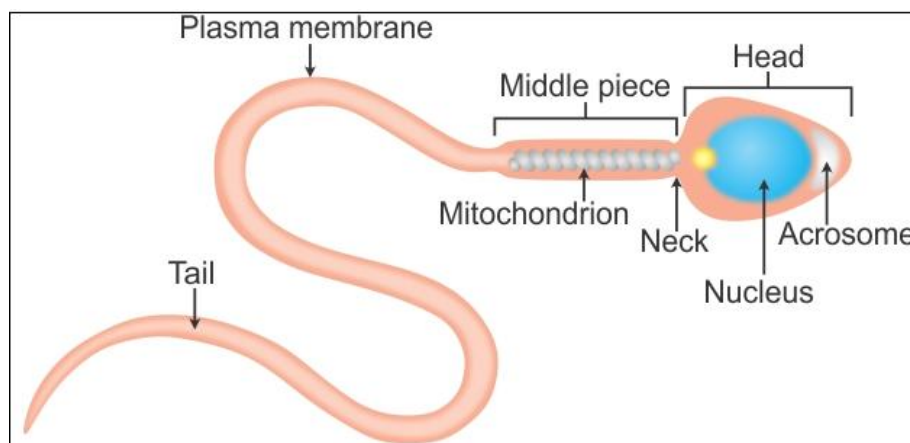
(b)

- (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**:



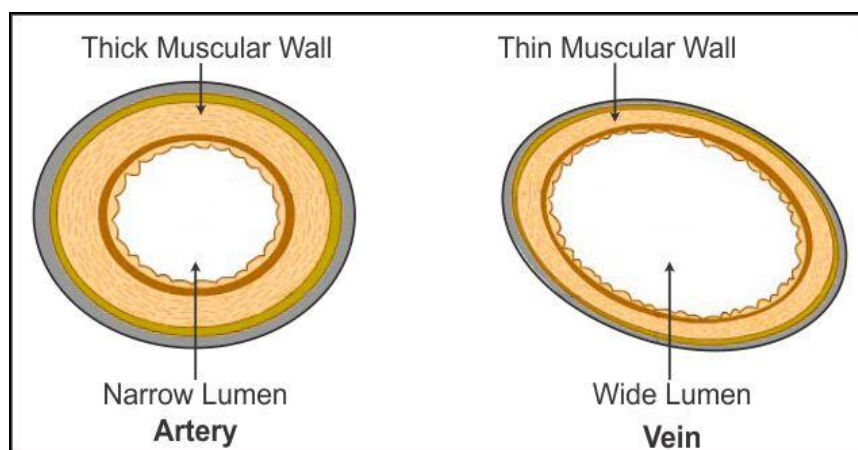
(b)

- (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.