Previous Year Solved Question Papers of

ICSE Class 10 Exams

BIOLOGY – 2011

Original Question Paper + Answer Key

(ICSE)

INDIAN CERTIFICATE OF SECONDARY EDUCATION

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ICSE Board
Class X Biology
Board Paper 2011
(One hour and a half)

General Instructions: **Total Marks: 80**

1. Answers to this paper must be written on the paper provided separately.
*2. You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.
3. The time given at the head of paper is the time allotted for writing the answers.
*4. Attempt **all** questions from **Section I** and **any four** questions from **Section II**.*
5. 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 mineral element essential for the clotting of blood.
(ii) The cells of the testes which produce the male hormones.
(iii) The nutritive layer of the eye which also prevents the reflection of light.
(iv) The structural and functional unit of the kidney.
(v) The part of the chloroplast where the light reaction of photosynthesis takes place.

(b) State the main functions of the following: [5]
(i) Yellow spot
(ii) Coronary artery
(iii) Medulla oblongata
(iv) Thrombocytes
(v) Vitreous humour

(c) Copy and complete the following by filling in the blanks 1 to 5 with appropriate words/terms/phrases: [5]
To test the leaf for starch, it is boiled in water to ……. (1). It is next boiled in methylated spirit to ……. (2). The leaf is placed in warm water to soften it. It is then placed in a dish and …….. (3) solution is added. The region which contains starch turns …….. (4), and the region which does not contain starch turns …….. (5).

(d) Give the exact location of the following: [5]

(i) Amnion
(ii) Pituitary gland
(iii) Mitral valve
(iv) Organ of Corti
(v) Hydathodes

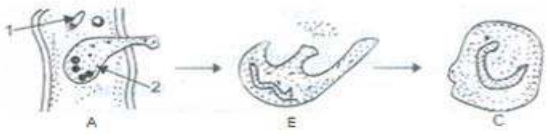
(e) State whether the following statements are true or false. If false, rewrite the correct form of the statement by changing the first or last word only: [5]

(i) Penicillin obtained from *Penicillium notatum* is an antibody.
(ii) Gestation is the process of fixing of the zygote to the uterine wall.
(iii) Centromere is an organelle of the cell to initiate cell division.
(iv) Urethra carries urine from the kidney to the urinary bladder.
(v) Lysosome is a part of the cell in which chromosomes are present.

(f) Rewrite and complete the following sentences by inserting the correct word in the space indicated: [5]

(i) …… is the phenomenon of contraction of the cytoplasm from the cell wall.
(ii) The blood vessel which begins and ends in capillaries is the ……..
(iii) Wooden doors swell up in the rainy season due to ……..
(iv) Phenotype is the observable characteristic which is …….. controlled.
(v) …….. vaccine is given to build up immunity against polio.

(g) Study the following diagram carefully and answer the questions which follow: [5]



(i) Name the cell 1.
(ii) What phenomenon is occurring in A?
(iii) Mention two structural differences between 1 and 2.
(iv) Name the process occurring in B and C and state the importance of this process in the human body.

(h) Match the items in Column I with that which is most appropriate in Column II. [5]

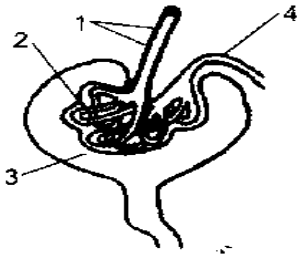
Column I	**Column II**
(1) Pacemaker	(a) Associated with static body balance
(2) Stroma	(b) Chordae tendinae
(3) Afferent nerve	(c) Site of light reaction
(4) Prolactin	(d) Motor neuron
(5) Sacculus	(e) SA node
	(f) Stimulates production of milk by the mammary gland
	(g) Site of dark reaction
	(h) Transmits impulses from receptor organ to spinal cord
	(i) Secreted by anterior lobe of pituitary gland
	(j) Transfers impulses from spinal cord to muscles

SECTION II [40 Marks]

*Attempt any **four** questions from this section.*

Question 2 [10]

(a) Study the diagram given below and answer the following questions:



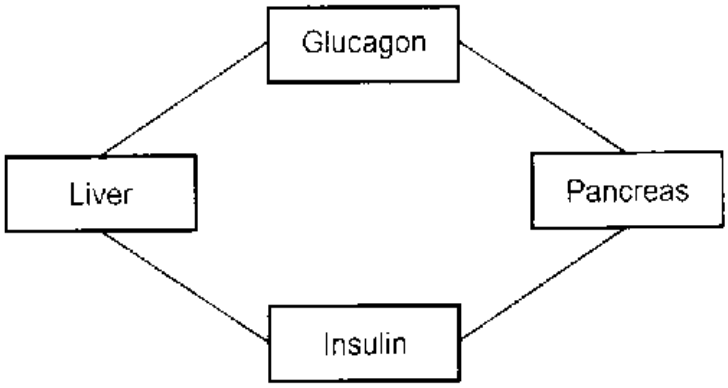
(i) Name the region in the kidney where this structure is present.
(ii) Name the parts labelled 1, 2, 3 and 4.
(iii) Name the stages involved in the formation of urine.
(iv) What is the technical term given to the process occurring in 2 and 3? Briefly describe the process.

(b) Give reasons for the following:

(i) People living in hilly regions usually suffer from simple goitre.
(ii) Urine is slightly thicker in summer than in winter.
(iii) Potato cubes when placed in water become firm and increase in size.
(iv) A matured mammalian erythrocyte lacks nucleus and mitochondria.
(v) Photosynthesis is considered as a process supporting all life on Earth.

Question 3 [10]

(a) Study the diagram given below and answer the following questions:

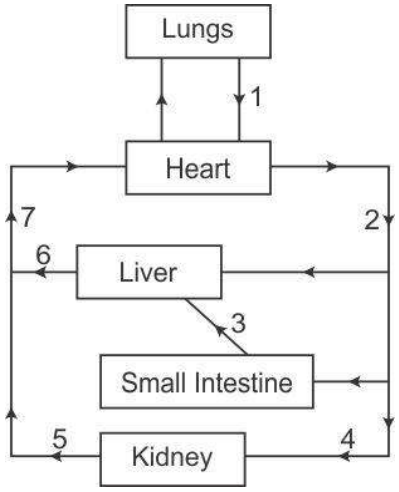


(i) Name the pancreatic cells which produce (1) glucagon and (2) insulin.
(ii) State the main function of (1) glucagon and (2) insulin.
(iii) Why is the pancreas referred to as an exo-endocrine gland?
(iv) Why is insulin not given orally but is injected into the body?
(v) What is the technical term for the cells of the pancreas which produce endocrine hormones?
(vi) Where in the body is the pancreas located?

(b) With reference to the functioning of the eye, answer the following questions:
(i) What is power of accommodation of the eye?
(ii) What is the shape of the lens during
(1) near vision and (2) distant vision?
(iii) Name the two structures in the eye responsible for bringing about the change in the shape of the lens.
(iv) Name the cells of the retina and their respective pigments which get activated (1) in dark and (2) in light.

Question 4 [10]

(a) The diagram below shows the human circulatory system. Answer the following questions:

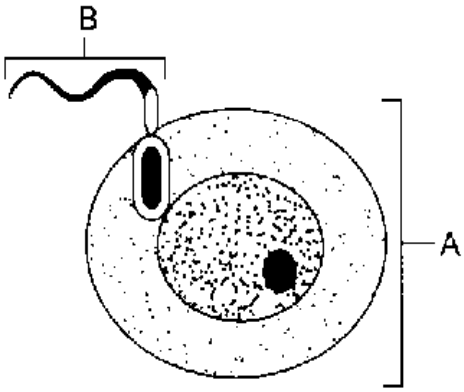


(i) Name the blood vessels 1, 3, 6 and 7.
(ii) Name the blood vessel supplying blood to the walls of the heart with oxygen.
(iii) Draw a neat labeled diagram of blood vessel '2' as seen in a cross-section.
(iv) Mention one structural difference between blood vessels numbered 4 and 5.

(b) With reference to the human ear, answer the following questions:
(i) Give the technical term for the structure found in the inner ear.
(ii) Name the three small bones present in the middle ear. What is the biological term for them collectively?
(iii) Name the part of the ear associated with (1) static balance, (2) hearing and (3) dynamic balance.
(iv) Name the nerve which transmits messages from the ear to the brain.

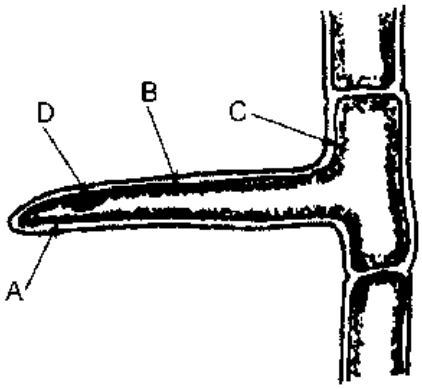
Question 5 [10]

(a) The diagram below shows two reproductive cells A and B. Answer the following questions based on the diagram:



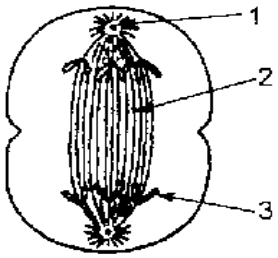
(i) Name the reproductive cells A and B.
(ii) Where are the above cells produced in the reproductive system?
(iii) Where do these cells unite in the female reproductive system?
(iv) Name the main hormones secreted by (1) ovary (2) testes.
(v) Name an accessory gland found in the male reproductive system and state the function of its secretion.

(b) The diagram shows a layer of epidermal cells showing a fully grown root hair. Answer the questions by seeing the diagram:



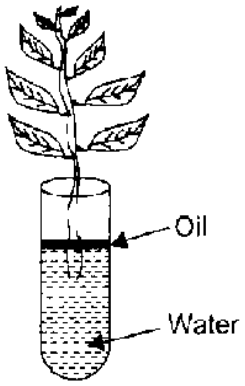
(i) Name the parts labelled A, B, C and D.
(ii) The root hair cell is in a turgid state. Name and explain the process which caused this state.
(iii) Mention one distinct difference between the parts labelled A and B.
(iv) Draw a diagram of the above root hair cell as it would appear when a concentrated solution of fertilisers is added near it.

(a) The diagram shows a stage during cell division. Study the diagram and answer the following questions:



(i) Name the parts labelled 1, 2 and 3.
(ii) Identify the stage shown here by giving one reason.
(iii) Where in the body does this type of cell division occur?
(iv) Name the stage prior to this stage and draw a diagram to represent the same.

(b) Study the diagram given below and answer the following questions:



(i) Name the process being studied in the above experiment.
(ii) Explain the process mentioned in (i) above.
(iii) Why is oil placed over water?
(iv) What do we observe with regard to the level of water when this setup is placed in (1) bright sunlight, (2) humid conditions and (3) on a windy day?
(v) Mention any three adaptations in plants to overcome the process mentioned in (ii) above.

(a)

(i) Mention the effects of two individuals in a street fight on the following organs by the autonomous nervous system (one has been done for you).

Organ	**Sympathetic system**	**Parasympathetic system**
Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
(1) Heart		
(2) Pupil of the eye		
(3) Salivary gland		

(ii) List four major activities of the Red Cross.

(b) Write the difference between the following pairs by following the indications in the brackets:

(i) Antiseptic and disinfectant (an example for each)
(ii) Erythrocytes and leucocytes (function)
(iii) Guttation and bleeding in plants (cause)
(iv) NADP and AIDS (expand the abbreviation)
(v) Monohybrid and dihybrid cross (phenotypic ratio)

SECTION I

Answer 1

(a)

(i) Calcium
(ii) Interstitial cells/Leydig cells
(iii) Choroid layer
(iv) Nephron/Uriniferous tubule
(v) Thylakoids

(b)

(i) Yellow spot: It is the region of sharpest and brightest vision in the eye.
(ii) Coronary artery: It supplies oxygenated blood to the heart muscles.
(iii) Medulla oblongata: It controls the activity of the internal organs.
(iv) Thrombocytes: They help in blood coagulation.
(v) Vitreous humour: It helps in keeping the shape of the eye ball.

(c)

To test the leaf for starch, it is boiled in water to kill the cells (1). It is next boiled in methylated spirit to remove chlorophyll (2). The leaf is placed in warm water to soften it. It is then placed in a dish and iodine (3) solution is added. The region which contains starch turns blue-black (4), and the region which does not contain starch turns brown (5).

(d)

(i) Amnion: uterus, around the embryo
(ii) Pituitary gland: base of the mid-brain, below the hypothalamus
(iii) Mitral valve: heart, between the left auricle and the left ventricle
(iv) Organ of Corti: inner ear, in the middle canal
(v) Hydathodes: margins of the leaves

(e)

(i) False.

Correct Statement: Penicillin obtained from *Penicillium notatum* is an antibiotic.

(ii) False.

Correct Statement: Implantation is the process of fixing of the zygote to the uterine wall.

(iii) True.

(iv) False.

Correct Statement: The ureter carries urine from the kidney to the urinary bladder.

(v) False.

Correct Statement: The nucleus is a part of the cell in which chromosomes are present.

(f)

(i) Plasmolysis is the phenomenon of contraction of the cytoplasm from the cell wall.

(ii) The blood vessel which begins and ends in capillaries is the hepatic portal vein.

(iii) Wooden doors swell up in the rainy season due to imbibition.

(iv) Phenotype is the observable characteristic which is genetically controlled.

(v) Salk's vaccine is given to build up immunity against polio.

(g)

(i) Cell 1 is a white blood cell (neutrophil).

(ii) Diapedesis

(iii) 1 – Erythrocyte (red blood cell)

2 – Leucocyte (white blood cell)

Erythrocytes	Leucocytes
1. Erythrocytes are biconcave and disc shaped.	1. Leucocytes are irregular in shape, usually amoeboid.
2. They are enucleated, i.e. the nucleus is absent.	2. Different shapes of nucleus are found in different kinds of leucocytes.

(iv) The process occurring in B and C is phagocytosis. During phagocytosis, WBCs, especially neutrophils, engulf the bacteria and destroy them. Any pathogens invading the body are killed by WBCs in this process. Thus, it protects the human body from infections and diseases.

(h)

Column I	**Column II**
1) Pacemaker	(e) SA Node
2) Stroma	(g) Site of dark reaction
3) Afferent nerve	(h) Transmits impulses from the receptor organ to the spinal cord
4) Prolactin	(f) Stimulates production of milk by the mammary gland
5) Sacculus	(a) Associated with static body balance

SECTION-II

Answer 2

(a)

(i) The above structure is present in the renal cortex of the kidney.

(ii) 1. Afferent arteriole
2. Glomerulus
3. Bowman's capsule
4. Efferent arteriole

(iii) Stages in urine formation are
1. Ultrafiltration
2. Reabsorption: Selective reabsorption and tubular secretion

(iv) The technical term given to the process in 2 and 3 is ultrafiltration.
The blood flows through the glomerulus under great pressure, which is much greater than in the capillaries elsewhere. The reason for this greater pressure is that the efferent arteriole is narrower than the afferent arteriole. This high pressure causes the smaller molecules of the blood to filter out through the glomerulus into the renal tubule. This filtration under extraordinary force is called ultrafiltration. The fluid entering the Bowman's capsule is called 'glomerular filtrate'.

(b)

(i) In hilly regions, the soil is deficient in iodine; thus, the food grown in such soil is also iodine deficient. Iodine is necessary for the synthesis of thyroid hormone. Simple goitre is caused by hyposecretion of thyroxine. Therefore, people living in hilly regions usually suffer from simple goitre.

(ii) During summer, more water is lost by perspiration, so there is more reabsorption of water from the kidney tubules into the blood. Thus, the urine is more concentrated and thicker. In winter, perspiration is highly reduced, so smaller amounts of water are reabsorbed by the kidney tubules, making the urine more dilute. Therefore, urine is slightly thicker in summer than in winter.

(iii) Potato cubes absorb water by the process of endosmosis and the cell membrane acts as a semi-permeable membrane. Due to endosmosis, the potato cubes increase in size. At this time due to turgor pressure and wall pressure, the potato becomes firm.

(iv) A lack of nucleus increases the surface area volume ratio. More erythrocytes can be accommodated in the same space. At the same time, the oxygen-carrying capacity of erythrocytes increases. Lack of mitochondria ensures that all the oxygen absorbed by RBCs is transported and delivered to the tissues. Therefore, a mature mammalian erythrocyte lacks a nucleus and mitochondria.

(v) Plants prepare their food by the process of photosynthesis. Herbivores are dependent on plants for their food. Carnivores depend on herbivores. All animals directly or indirectly are dependent on plants to obtain food for energy. Therefore, photosynthesis is considered to be a process supporting all life on Earth.

Answer 3

(a)

(i) (1) Glucagon: alpha cells.
(2) Insulin: beta cells.

(ii) (1) In case of low blood sugar levels, glucagon stimulates the breakdown of glycogen into glucose in the liver and raises the blood sugar level.
(2) Insulin controls the high blood sugar level in the body. It promotes the glucose utilisation by the body and the conversion of glucose into glycogen in the liver to maintain the normal sugar level.

(iii) The pancreas contains exocrine glands, which are duct glands, secreting pancreatic juice in the small intestine which helps in digestion. On the other hand, it also contains islets of Langerhans which are endocrine glands secreting insulin, glucagon and somatostatin. Therefore, the pancreas is referred to as an exo-endocrine gland.

(iv) Insulin is a hormone and proteinaceous in nature. If taken orally, it may be broken down due to the digestion process in the stomach by digestive juices, so it is not taken orally.

(v) Islets of Langerhans is the technical term for the cells of the pancreas which produce endocrine hormones.

(vi) Pancreas is located in the abdomen, between the stomach and the small intestine.

(b)

(i) The process of focusing the eye at different distances is called power of accommodation of the eye.

(ii) (1) During near vision, the shape of the lens is round or convex.
(2) During distant vision, the shape of the lens is flattened or thinner.

(iii) The two structures which are responsible for bringing about the change in the shape of the lens are the ciliary muscles and the suspensory ligaments.

(iv) (1) In the dark, the rod cells and their pigment rhodopsin get activated.
(2) In the light, the cone cells and their pigment iodopsin get activated.

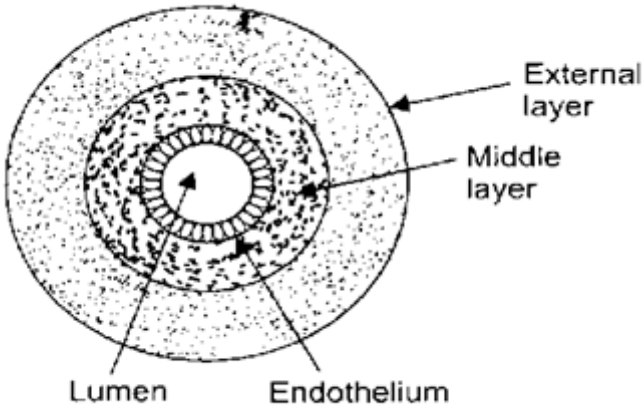
Answer 4

(a)

(i) 1 – Pulmonary vein
3 – Hepatic portal vein
6 – Hepatic vein
7 – Inferior vena cava

(ii) Coronary arteries supply blood to the heart with oxygen.

(iii) 2. Aorta.



(iv)

Renal Artery	Renal Vein
1. The renal artery has thick muscular walls.	1. The renal vein has thin muscular walls.
2. It has a narrow lumen.	2. It has a wider lumen.
3. Valves are absent in the renal artery.	3. Valves are present in the renal vein.

(b)

(i) Membranous labyrinth

(ii) Malleus (hammer), incus (anvil) and stapes (stirrup). The biological term is **ear ossicles**.

(iii) (1) Static balance: sacculus and utriculus
(2) Hearing: cochlea/organ of Corti
(3) Dynamic balance: semicircular canal

(iv) Auditory nerve

Answer 5

(a)

(i) A – Ovum; B – Sperm

(ii) The ovum is produced in the ovary, and sperms are produced in the testes by the seminiferous tubules.

(iii) Oviduct or fallopian tube

(iv) Hormone secreted by

(1) Ovary: oestrogen

(2) Testes: testosterone

(v) An accessory gland found in the male reproductive system is the prostate gland. The secretions of the prostate gland contribute to sperm motility and viability.

(b)

(i) A – Cell wall

B – Cell membrane

C – Epidermal cell

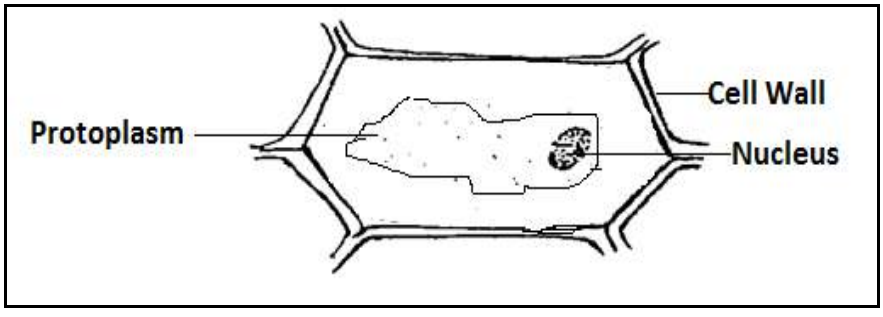
D – Nucleus

(ii) The process is osmosis which causes the cell to become turgid. Osmosis is the movement of water molecules from a region of their high concentration to a region of their low concentration through a semi-permeable membrane.

(iii) Part A: Cell wall; Part B: Cell membrane

Cell Wall	Cell Membrane
The cell wall is a freely permeable membrane.	The cell membrane is a semi-permeable membrane.

(iv)



Answer 6

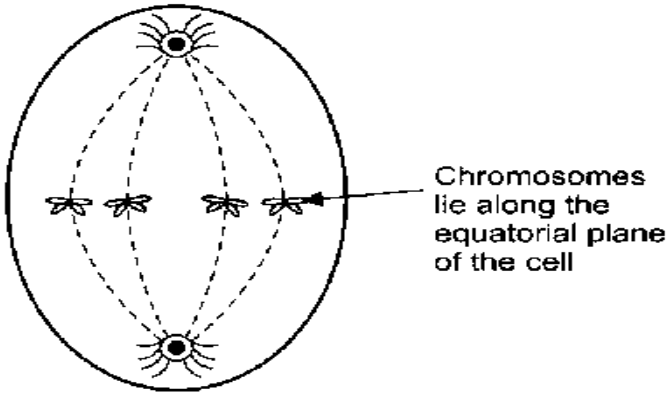
(a)

(i) 1 – Aster
2 – Spindle fibres
3 – Chromatids

(ii) The two chromatids of each chromosome separate and move apart towards opposite poles. So, this is the anaphase stage.

(iii) This type of cell division takes place in body cells or somatic cells.

(iv) The stage prior to anaphase is metaphase.



(b)

(i) The process studied is transpiration.

(ii) Transpiration is the process by which plants lose water in the form of water vapour through their aerial parts. Transpiration helps plants to maintain their body temperature. It also cools the regions around the plant.

(iii) Oil is placed over water to prevent any water loss by evaporation from the surface of water.

(iv) The level of water will
(1) Reduce in bright sunlight
(2) Remain the same in humid conditions
(3) Reduce on a windy day

(v) Three adaptations in plants to overcome transpiration are
1. Sunken stomata, e.g. *Nerium*
2. Fewer stomata
3. Narrow leaves

Answer 7

(a)

(i)

Organ	Sympathetic system	Parasympathetic system
(1) Heart	Accelerates heartbeat	Retards heartbeat
(2) Pupil of the eye	Dilates the pupil	Constricts the pupil
(3) Salivary gland	Inhibits secretion of saliva	Stimulates secretion of saliva

(ii) Four activities of the Red Cross:

1. To extend relief and help to the victims of any calamity such as floods, fires, famines, earthquakes etc.
2. To produce and supply blood for the needy victims of war or other calamities.
3. To extend all possible first aid at the site of an accident.
4. To look after maternal and child welfare centres.

(b)

(i) Antiseptic	**Disinfectant**
Carbolic acid, Dettol	Phenol, Formalin

(ii) Erythrocytes	**Leucocytes**
Erythrocytes contain the haemoglobin pigment which is an oxygen carrier. Thus, they supply oxygen at the cell level.	Leucocytes help in the defence mechanism of the body. They destroy invading pathogens by phagocytosis.

(iii) Guttation	**Bleeding**
Guttation is caused when a humid environment hampers transpiration but the roots continue to absorb water which builds up a hydrostatic pressure within the plant.	Bleeding occurs due to an injury to the plant. The plant sap escapes from the ruptured part of the plant.

(iv) NADP	**AIDS**
Nicotinamide adenine dinucleotide phosphate	Acquired immunodeficiency syndrome

(v) Monohybrid ratio	**Dihybrid ratio**
3:1	9:3:3:1