



Previous Year Solved Question Papers of

**ICSE Class 10 Exams**

**BIOLOGY - 2009**

**Original Question Paper + Answer Key**

**(ICSE)**

**INDIAN CERTIFICATE OF  
SECONDARY EDUCATION**



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**Board Paper 2009**  
**(One hour and a half)**

**General Instructions:**

**Total Marks: 80**

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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 the 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:

- (i) The statistical study of the human population of a region.
- (ii) The biological term given to the protective membranes of the brain.
- (iii) The photosensitive pigment present in the rod cells of the retina.
- (iv) The cell organelle responsible for photosynthesis.
- (v) The internal layer of the eye which prevents the reflection of light. [5]

**(b)** State whether the following statements are true or false. If false, write the correct form of the statement by changing the **first or last word** only.

- (i) The resting stage in mitosis is called interphase.
- (ii) Photosynthesis occurs in all the cells of the plant.
- (iii) The pituitary gland is both exocrine and endocrine in function.
- (iv) Chemicals applied to spots and places to kill harmful microorganisms are called disinfectants.
- (v) All voluntary actions are controlled by the cerebellum. [5]

**(c)** Give the specific function of the following structures found in the body of plants/animals.

- (i) Hydathodes
- (ii) Centrosome
- (iii) Xylem
- (iv) Corpus luteum
- (v) Eustachian tube

[5]

**(d)** Identify and name the following processes/terms from the statements given below:

- (i) Movement of molecules from a region of high concentration to a region of low concentration.
- (ii) Mild chemical applied on the skin to kill germs.
- (iii) Chromosomes appear thread like.
- (iv) The loss of water from injured parts of a plant.
- (v) A pair of chromosomes carrying dissimilar alleles for a particular character.

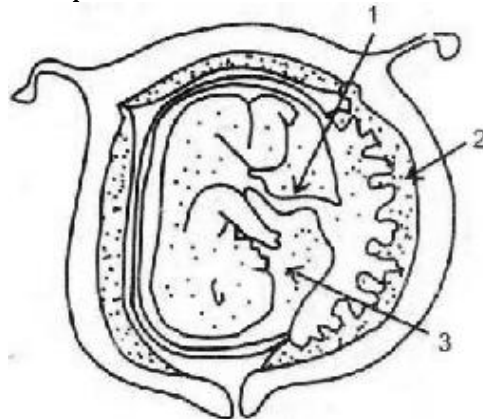
[5]

**(e)** Classify the following actions as simple reflex or conditioned reflex:

- (i) Playing a guitar.
- (ii) Removing your hand suddenly when pricked by a thorn.
- (iii) Applying sudden brakes when a dog crosses your path.
- (iv) Blinking of the eyelids on exposure to light.
- (v) Tying one's shoe lace.

[5]

**(f)** The diagram given below is that of a developing human foetus in the womb. Study the same and then answer the questions which follow:



- (i) Name the part labelled 1.
- (ii) Mention any two functions of the part labelled 2.
- (iii) Explain the role played by the part labelled 3.
- (iv) What is the normal gestation period (in days) of the developing foetus?

[5]

**(g)** Explain the following terms:

- (i) Natality
- (ii) Photolysis in photosynthesis
- (iii) Antibiotic
- (iv) Root pressure
- (v) Parturition

[5]

**(h)** Given below are five statements or questions followed by four choices. Select and **rewrite** the correct answer to the given statements from the four choices given below each statement:

(i) The cerebral hemispheres in mammals are connected by the

- (i) Corpus luteum
- (ii) Hypothalamus
- (iii) Pons varolii
- (iv) Corpus callosum

(ii) Insulin is secreted by the

- (i) Beta cells of the pancreas
- (ii) Alpha cells of the pancreas
- (iii) Delta cells of the pancreas
- (iv) None of the above

(iii) A destarched plant is one whose

- (i) Leaves are free from chlorophyll
- (ii) Aerial parts are free from starch
- (iii) Leaves are free from starch
- (iv) Plant is free from starch

(iv) The onset of menstruation in a female is termed

- (i) Ovulation
- (ii) Menarche
- (iii) Menopause
- (iv) Parthenogenesis

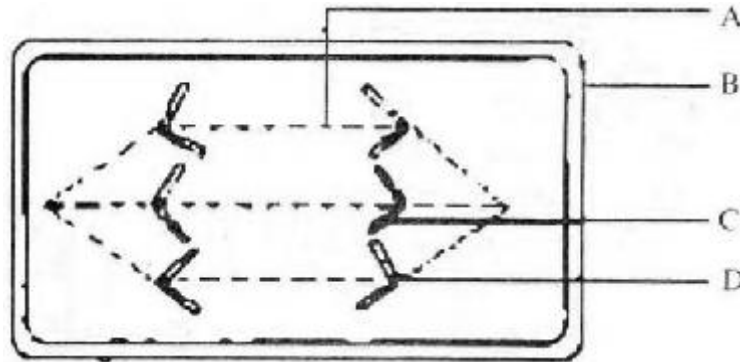
(v) BCG vaccine provides immunity against

- (i) Tetanus
- (ii) Cholera
- (iii) Tuberculosis
- (iv) AIDS

[5]

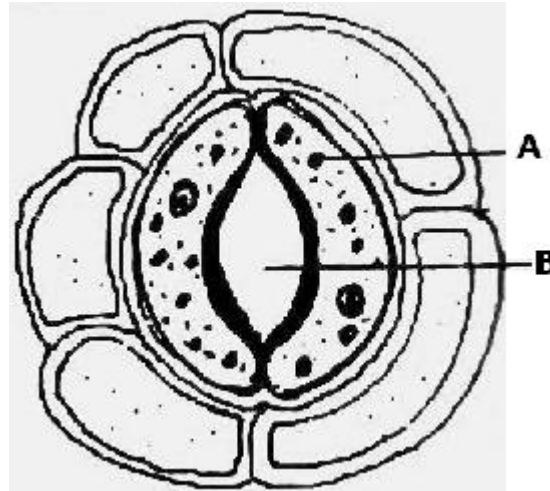
**Question 2**

- (a) The diagram below represents a stage in cell division. Study the same and answer the questions which follow:



- (i) Identify the stage of cell division.
  - (ii) Name the parts labelled A, B, C and D.
  - (iii) What is the unique feature observed in this stage?
  - (iv) Where does this type of cell division usually occur?
  - (v) How many daughter cells are formed from this type of cell division?
  - (vi) Is the dividing cell shown a plant or an animal cell? Give a reason to support your answer.
- [5]

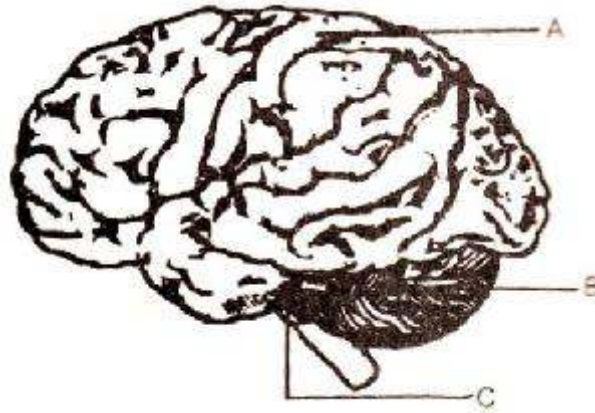
(b) The diagram below represents a structure found in a leaf. Study the same and answer the questions which follow:



- (i) Name the parts labelled A and B.
- (ii) What is the biological term for the above structure?
- (iii) What is the function of the part labelled A?
- (iv) Mention two structural features of A which help in the function mentioned in (iii) above.
- (v) Where is this structure likely to be found in a leaf?
- (vi) The above structure helps in the process of transpiration. Explain the term transpiration.
- (vii) How many other cells are found surrounding this structure as seen in the diagram?

[5]

**(a)** The diagram shows a section of the human brain. Answer the questions which follow:



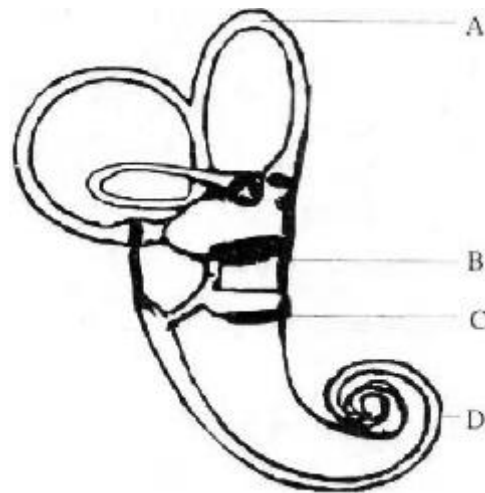
- (i) Name the parts labelled A, B and C.
- (ii) Give the main function of each of the parts A, B and C.
- (iii) Name the three protective membranes covering the brain.
- (iv) Name the basic unit of the brain. [5]

**(b)**

- (i) Mention any three adaptations found in plants to favour the process of photosynthesis.
- (ii) Why does one feel blinded for a short while on coming out of a dark room?
- (iii) Explain how the rate of transpiration is affected on
  - 1. A windy day
  - 2. A foggy day[5]

**Question 4**

- (a)** The diagram below represents the structure found in the inner ear. Study the same and then answer the questions which follow:



- (i) Name the parts labelled A, B, C and D.
- (ii) Name the part of the ear responsible for transmitting impulses to the brain.
- (iii) Name the part labelled above which is responsible for
1. Static equilibrium
  2. Dynamic equilibrium
  3. Hearing
- (iv) Name the audio receptor cells which pick up vibrations.
- (v) Name the fluid present in the inner ear. [5]
- (b)** Name the hormone responsible for the following functions:
- (i) Increase in heart beat
  - (ii) Maintains glucose level in the blood
  - (iii) Converting glycogen to glucose
  - (iv) Regulates basal metabolism
  - (v) Ossification of bones
  - (vi) Prepares the body during an emergency
  - (vii) Responsible for normal growth of the whole body
  - (viii) Regulates the functioning of the male and female reproductive organs
  - (ix) Increased reabsorption of water in the kidneys
  - (x) Increased blood supply to muscles [5]



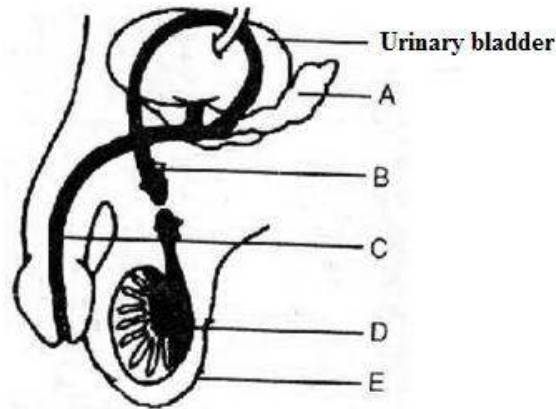
**Question 5**

**(a)** The diagram below represents a surgical sterilisation method in males.

Study the same and answer the questions which follow:

- (i) Name the parts marked A, B, C, D and E.
- (ii) Give the name of the surgical method represented in the diagram.
- (iii) Which part is ligated or cut?
- (iv) Name the corresponding surgical method conducted on females.
- (v) Name the part which is ligated in females and why?

[5]



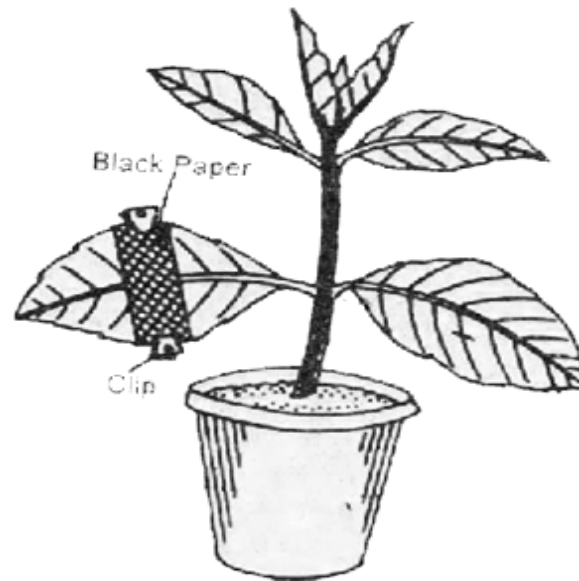
**(b)**

- (i) Explain the following terms:
  - a. Monohybrid cross
  - b. Gene
  - c. Phenotype
- (ii) Name the two sex-linked diseases in males.
- (iii) State Mendel's law of segregation.

[5]

**Question 6**

- (a) The diagram below represents an experiment conducted to prove the importance of a factor in photosynthesis. Study the same and then answer the questions which follow:



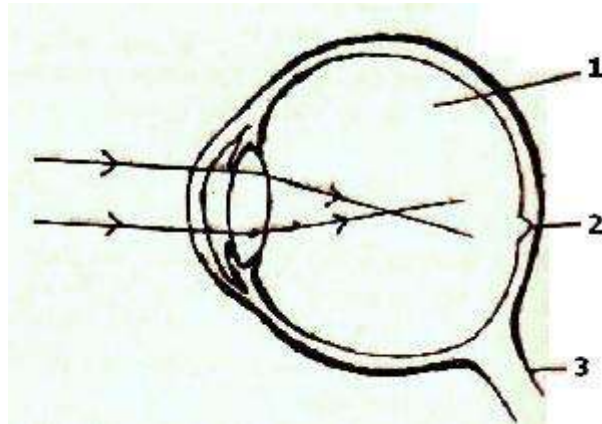
- (i) Name the factor being studied in this experiment?
- (ii) Why was the plant kept in a dark room before conducting the experiment?
- (iii) Why was the experimental leaf then kept in  
1. boiling water; 2. methylated spirit?
- (iv) Name the solution used to test for the presence of starch in the leaf.
- (v) What will we observe in the experimental leaf at the end of the starch test?
- (vi) Give a balanced chemical equation to represent the process of photosynthesis. [5]

**(b)**

- (i) Mention three adaptations found in plants to reduce transpiration.
- (ii) Name any three germ-killing secretions of our body.
- (iii) What are the age restrictions for marriage of boys and girls in India?
- (iv) Mention two activities of the Red Cross. [5]

**Question 7**

- (a) Given below is a diagram depicting a defect of the human eye. Study the same and then answer the questions which follow:



- (i) Identify the defect.  
(ii) Name the parts labelled 1, 2 and 3.  
(iii) Give two possible reasons for this eye defect.  
(iv) Draw a labelled diagram to show how the above-mentioned defect is rectified. [5]
- (b) Complete the following by filling in the blanks numbered 1 to 10 with the appropriate word/term:

Photosynthesis involves a light reaction and a dark reaction. During the light reaction, the chlorophyll present in the (1) \_\_\_\_\_ gets activated by absorbing light energy. This energy splits (2) \_\_\_\_\_ molecules to (3) \_\_\_\_\_ and oxygen and releases two electrons. This process is called (4) \_\_\_\_\_. The (5) \_\_\_\_\_ ions are picked up by NADP to form (6) \_\_\_\_\_. The ADP is converted to (7) \_\_\_\_\_. This process is called (8) \_\_\_\_\_. During the dark phase, the compound produced at the end of the light reaction reacts with carbon dioxide to form (9) \_\_\_\_\_. This product is converted to starch. The process is called (10) \_\_\_\_\_. [5]

Board Paper 2009 - Solution

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## SECTION I

**Answer 1****(a)**

- (i) Demography
- (ii) Meninges
- (iii) Rhodopsin
- (iv) Chloroplast
- (v) Choroid

**(b)**

- (i) True.
- (ii) False.

Correct Statement: Respiration occurs in all the cells of the plant.

- (iii) False.

Correct Statement: The pancreas is both exocrine and endocrine in function.

- (iv) True.

- (v) False.

Correct Statement: All voluntary actions are controlled by the cerebrum.

**(c)**

- (i) Hydathodes: These are openings through which guttation occurs in plants.
- (ii) Centrosome: It initiates and regulates cell division in animal cells.
- (iii) Xylem: Absorbed water and mineral salts from soil are transported through xylem to all parts of the plant.
- (iv) Corpus luteum: It secretes progesterone.
- (v) Eustachian tube: It helps to equalise air pressure on both sides of the eardrum.

**(d)**

- (i) Diffusion
- (ii) Antiseptic
- (iii) Chromatin
- (iv) Bleeding
- (v) Heterozygous

- (e)
- (i) Conditioned reflex
  - (ii) Simple reflex
  - (iii) Conditioned reflex
  - (iv) Simple reflex
  - (v) Conditioned reflex

**(f)**

- (i) Umbilical cord
- (ii) It is the placenta.  
Functions of the placenta are
  1. Nutrients diffuse from the mother's blood into the foetus' blood.
  2. Oxygen is supplied to the foetus through the placenta, and carbon dioxide and waste products diffuse into the mother's blood from the foetus' blood.
- (iii) The amniotic fluid forms a cushion around the embryo and protects it from jerks and shocks. It also protects the embryo from getting dried up.
- (iv) 280 days

**(g)**

- (i) Natality: It is the number of live births per 1000 people of population per year.
- (ii) Photolysis: It is the breakdown of water molecules into hydrogen and hydroxyl ions by the light-activated chlorophyll during the light dependent reaction.
- (iii) Antibiotic: These are chemicals produced by living microorganisms, and they can kill or inhibit the growth of other microorganisms.
- (iv) Root pressure: It is the pressure developed in the living cells of roots which help to push the cell sap upwards into the xylem.
- (v) Parturition: The expulsion or delivery of the fully developed foetus from the uterus is called parturition.

**(h)**

- (i) The cerebral hemispheres in mammals are connected by the **corpus callosum**.
- (ii) Insulin is secreted by the **beta cells of the pancreas**.
- (iii) A de-starched plant is one whose **leaves are free from starch**.
- (iv) The onset of menstruation in the female is termed **menarche**.
- (v) BCG vaccine provides immunity against **tuberculosis**.

**Answer 2****(a)**

- (i) Anaphase
- (ii) A – Spindle fibres  
B – Cell wall  
C – Chromatid  
D – Centromere
- (iii) Each chromosome has divided into two sister chromatids which are moving away from each other towards the opposite poles.
- (iv) This type of cell division occurs in all somatic cells.
- (v) Two daughter cells are formed from this type of cell division.
- (vi) The dividing cell shown is a plant cell because the centrosome is absent and a cell wall is present, both of which are characteristics of plant cells.

**(b)**

- (i) A – Guard cell  
B – Stoma
- (ii) Stomatal apparatus
- (iii) Guard cells regulate the opening and closing of the stomata.
- (iv) Guard cells have thick inner walls and thin outer walls.  
The turgidity and flaccidity of guard cells help to regulate the closing and opening of the stomata.
- (v) The stomata are found on the upper and lower epidermis of the leaf.
- (vi) Transpiration: It is the loss of water as water vapour from the aerial parts of the plant. Of the total water absorbed, only 2% of the water is used by the plant body and the rest of the water is lost by transpiration. Transpiration helps to cool the plant body. It also helps maintain the temperature of the surrounding region.
- (vii) Five epidermal cells which are also known as accessory cells.

**Answer 3**

**(a)**

- (i) A – Cerebrum  
B – Cerebellum  
C – Medulla oblongata
- (ii) A (Cerebrum) – It controls memory, will power, judgment, intelligence and voluntary functions.  
B (Cerebellum) – It maintains body balance and coordination in muscular activities.  
C (Medulla oblongata) – It controls the activities of the internal organs such as heart beat, breathing, swallowing etc.
- (iii) Outer dura mater, middle layer of arachnoid and inner pia mater
- (iv) Neuron

**(b)**

(i) Adaptations in plants to favour photosynthesis:

1. A large number of chloroplasts is found in the upper layers of the leaf to trap light energy quickly.
  2. The orientation of the leaves is such that maximum light falls on the leaf so that it can be absorbed.
  3. Numerous stomata on the leaves allow rapid exchange of gases.
- (ii) In a dark room, the pupil widens, but in bright light, more light enters the eye through the widened pupil. Also, rhodopsin is generated in the dark, and it breaks down in the light, as well as the cones start functioning. This affects the eye causing a glare and one feels blinded.
- (iii) 1. On a windy day, the rate of transpiration increases because the water vapour released during transpiration is quickly removed with the flowing air. This does not allow the water vapour to saturate in the surrounding region of the plant.
2. A foggy day has more moisture in the air. Due to more moisture, the air cannot absorb much water vapour released by the plants. Therefore, the rate of transpiration decreases.

**Answer 4**

**(a)**

(i) A – Semicircular canal

B – Utriculus

C – Sacculus

D – Cochlea

(ii) Optic nerve

(iii)

1. Sacculus and utriculus are responsible for static equilibrium.

2. Semicircular canals are responsible for dynamic equilibrium.

3. Cochlea is responsible for hearing.

(iv) Sense cells of organ of Corti

(v) Endolymph

**(b)**

(i) Increase in heart beat: **adrenaline/epinephrine**

(ii) Maintains glucose level in the blood: **insulin**

(iii) Converting glycogen to glucose: **glucagon**

(iv) Regulates basal metabolism: **thyroxine**

(v) Ossification of bones: **parathormone**

(vi) Prepares the body during emergency: **adrenaline**

(vii) Responsible for normal growth of the whole body: **growth hormone**

(viii) Regulates the functioning of the male and female reproductive organs:  
**gonadotropin**

(ix) Increased reabsorption of water in the kidneys: **vasopressin**

(x) Increased blood supply to muscles: **adrenaline**



**Answer 5**

**(a)**

- (i) A – Seminal vesicle  
B – Vas deferens  
C – Urethra  
D – Testes  
E – Scrotum
- (ii) Vasectomy
- (iii) Vas deferens, i.e. the sperm duct.
- (iv) Tubectomy is conducted in females.
- (v) In females, the fallopian tubes are ligated. This is because the fallopian tubes are the site of fertilisation. The fusion of male sperm and female egg takes place inside the fallopian tubes.

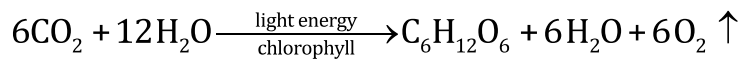
**(b)**

- (i)
  - a. Monohybrid Cross:  
A cross in which only one contrasting character is considered is called a monohybrid cross.
  - b. Gene:  
A gene is a specific sequence of nucleotides on a chromosome which encodes particular proteins and which is expressed in the form of some particular feature of the body.
  - c. Phenotype: The phenotype is the physical characters expressed by the genes in the offspring.
- (ii) Colour blindness and haemophilia are the two sex-linked diseases in males.
- (iii) Mendel's law of segregation:  
According to the law of segregation, the two members of a pair of factors separate during the formation of gametes. They do not mix or blend with each other but separate into different gametes.

**Answer 6**

**(a)**

- (i) The light factor is being studied in this experiment.
- (ii) The plant was kept in a dark room to destarch its leaves, i.e. to remove all the starch present in the leaves of the plant.
- (iii) 1. The experimental leaf was kept in boiling water to kill the cells.  
2. The experimental leaf was kept in methylated spirit to remove the chlorophyll.
- (iv) Iodine solution
- (v) The exposed parts of the leaf will turn blue-black, i.e. will show the presence of starch, and the part covered with black paper will remain brown, showing the absence of starch.
- (vi) The process of photosynthesis:



**(b)**

- (i) Three adaptations found in plants to reduce transpiration are as follows:
  - 1. The leaves are covered by a thick cuticle: In evergreen plants, such as banyan, the leaves remain covered by a thick waxy cuticle. This reduces the rate of transpiration.
  - 2. Reduced number of stomata: The reduced number of stomata in the upper epidermis greatly reduces transpiration.
  - 3. Narrow leaves: The leaves become narrower so as to reduce the surface area. In some cases, the leaves are modified into spines as in xerophytic plants.
- (ii) Saliva, tears, sweat
- (iii) The age is 21 years for boys and 18 years for girls.
- (iv) Activities of the Red Cross:
  - (a) To supply blood to the needy victims of war and calamity.
  - (b) To arrange ambulance services in emergencies.

**Answer 7**

**(a)**

(i) Myopia

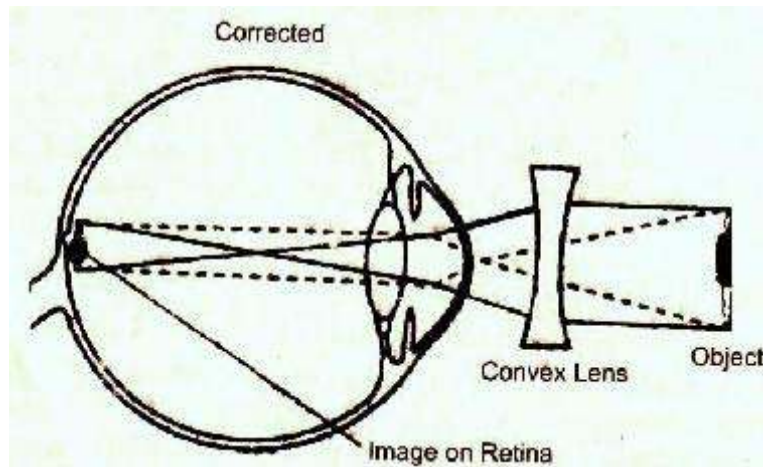
(ii)

1. Vitreous chamber
2. Yellow spot
3. Optic nerve

(iii) Reasons for myopia:

- (a) The eye ball lengthens from front to back.
- (b) The lens becomes too curved.

(iv) Rectification of myopia:



**(b)**

1. Chloroplasts
2. Water
3. Hydrogen
4. Photolysis of water
5. Hydrogen
6. NADPH
7. ATP
8. Photophosphorylation
9. Glucose
10. Polymerisation

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