



Previous Year Solved Question Papers of

ICSE Class 10 Exams

BIOLOGY - 2007

Original Question Paper + Answer Key

(ICSE)

**INDIAN CERTIFICATE OF
SECONDARY EDUCATION**



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Board Paper 2007
(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 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) Cytoplasmic organelles which help in the manufacture of starch.
- (ii) The statistical study of human population.
- (iii) Pair of genes responsible for a particular characteristic in an individual.
- (iv) A solution whose concentration is greater than that of the cell sap.
- (v) The fluid which provides protection and nourishment to the cells of the brain. [5]

(b) State whether the following statements are true or false. If false, write the correct statement by changing the **incorrect word/words** only.

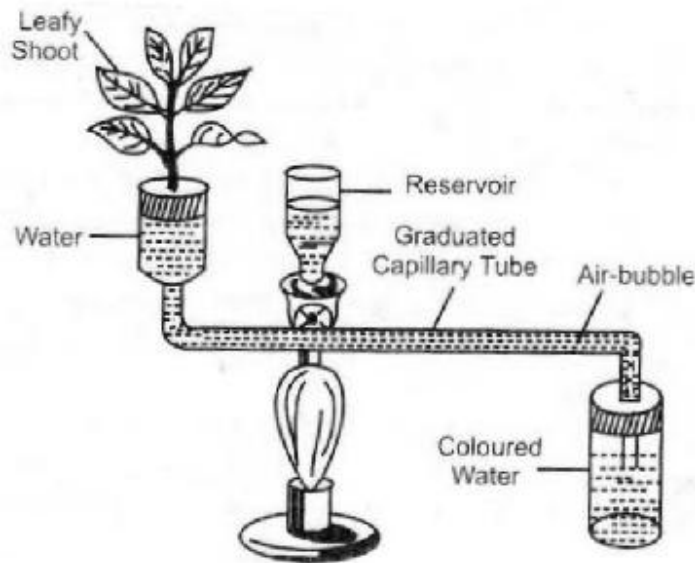
- (i) Mortality is the number of deaths per thousand of the population per decade.
- (ii) The symbiotic bacterium which helps in nitrogen fixation is *Rhizobium radicum*.
- (iii) Rods are responsible for vision in the dark.
- (iv) The dark reaction of photosynthesis is light independent.
- (v) The process of fusion of the sperm nucleus and the egg nucleus is termed implantation. [5]

(c) Match the items in Column A with those which are most appropriate in Column B. You must rewrite the matching pairs.

Column A	Column B
1. Basic unit of life	A. Glucagon
2. Beta cells of pancreas	B. Meninges
3. Meiosis	C. Iris
4. Protective covering of the brain	D. Cell
5. Constriction of the pupil of the eye	E. Insulin
	F. Skin cell
	G. Protoplasm
	H. Sperm
	I. Ciliary muscles

[5]

(d) Given below is an apparatus used to study a particular process in plants. Study the same and answer the questions which follow:



- (i) Name the apparatus.
- (ii) Mention one limitation of this apparatus.
- (iii) Which phenomenon is studied with the help of this apparatus?
- (iv) What is the function of the part marked 'Reservoir'?
- (v) What is the role of the air bubble in the experiment?

[5]

(e) In the box given below is a list of biological terms which can be used to complete the statements which follow. Select the appropriate term from the box and re-write the completed statement. You may use a term only once.

Concave, Neuron, Lactic acid, Glucose, Animal waste, Gestation, Nerve, Ethyl alcohol, Nephron, Myopia, DDT, Pregnancy, Convex

- (i) The type of lens used to correct myopia is _____.
- (ii) The basic unit of the human brain is the _____.
- (iii) The end-product of fermentation is _____.
- (iv) A non-degradable pollutant is _____.
- (v) The period of complete development of the foetus till birth is termed _____. [5]

(f) Given below are the functions of certain organs/structures found in living organisms. In each case, name the organ or structure which

- (i) Produces testosterone
- (ii) Is responsible for protecting the eye from sweat
- (iii) Transmits characteristics from the parent to the offspring
- (iv) Transports water from the soil to other parts of the plant
- (v) Initiates cell division [5]

(g) Explain the following terms:

- (i) Tropic hormone
- (ii) Guttation
- (iii) Osmosis
- (iv) Stereoscopic vision
- (v) Mutation [5]

(h) Given below is a set of terms arranged in a logical sequence, representing a process or a function. Of these, one term is incorrect. Identify the incorrect term and replace it with the correct term. One has been done for you as an example.

E.g. Pollen grain → Exine → Staminal tube → Male gametes → Micropyle

Incorrect term – Staminal tube. Correct term – Pollen tube

- (i) Seminiferous tubule → Sperm → Sperm duct → Accessory glands → Semen → Ureter
- (ii) Soil water → Root hair → Cells of cortex → Epidermis → Xylem
- (iii) Oxygen → Stoma → Respiratory cavity → Mesophyll cells → Oxidation of glucose → 2 ATP
- (iv) Pupil → Eye lens → Vitreous humour → Fovea → Auditory nerve
- (v) Sensory nerve → Dorsal root ganglion → Sensory neuron → Motor neuron →

SECTION II (40 Marks)

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

Question 2

(a) Differentiate between the following on the basis of what is given in brackets:

(i) Biofertiliser and chemical fertiliser (an example of each)

(ii) Karyokinesis and cytokinesis (explain the terms)

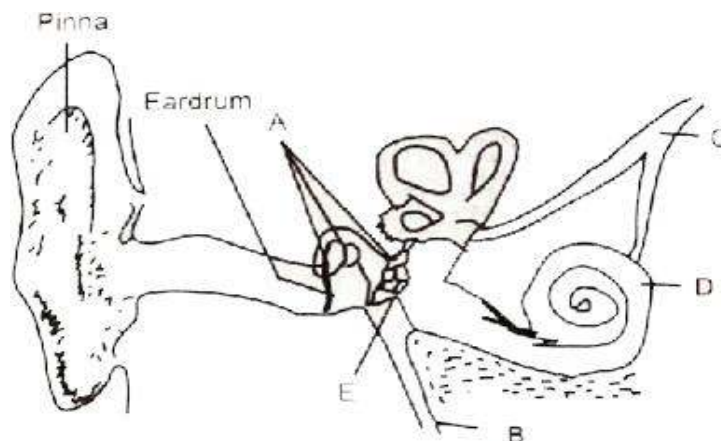
(iii) WHO and Red Cross (any one function of each)

(iv) Mitosis and meiosis (number of daughter cells formed)

(v) Pure and hybrid strains (definition)

[5]

(b) Given below is the diagram of the human ear. Study the same and answer the questions which follow:



(i) Give the biological term for the part labelled 'A' and state its function.

(ii) Name the part labelled 'B' and state its function.

(iii) Name the part labelled 'C' and state its function.

(iv) Give the function of ear wax.

[5]

Question 3

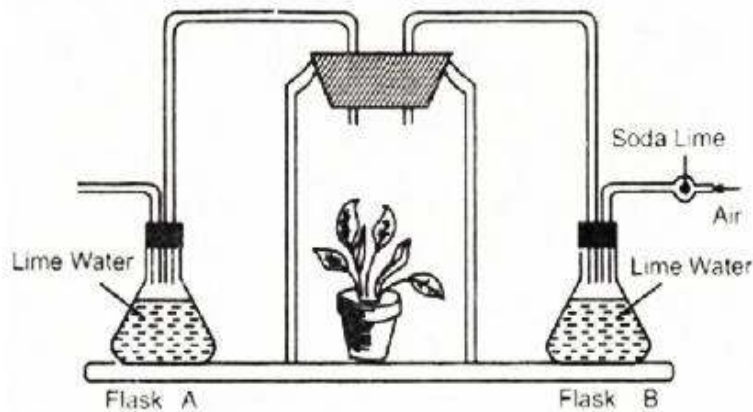
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EBC

(a) Answer the following questions briefly:

- (i) Why is carbon dioxide considered an air pollutant?
- (ii) Name any two vaccines and mention the diseases against which they give immunity.
- (iii) Mention two reasons for the high birth rate in India.
- (iv) State two effects of the smog observed in major cities. [5]

(b) Given below is an experiment, set up by a candidate, to study the process of respiration in plants. The candidate failed to get the expected result as two mistakes were made while setting up the experiment.



- (i) Identify and state the two mistakes made by the candidate.
- (ii) What is the role of soda lime in the experiment?
- (iii) What is the purpose of using lime water in flasks 'A' and 'B'?
- (iv) Give the chemical equation to represent the process of respiration. [5]

(a)

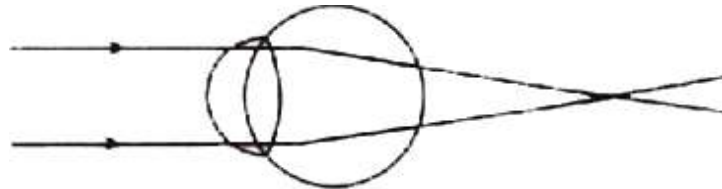
- (i) Draw a neat and well-labelled diagram of the chloroplast.
- (ii) List the events taking place in the photo-chemical phase of photosynthesis.
- (iii) If you are planning an experiment to show the effect of light on photosynthesis:
 - 1) Will you select white light or green light? Justify your answer.
 - 2) Why would you select a destarched plant? [5]

(b)

- (i) Explain the term reflex action.
- (ii) Expand the following biological abbreviations: 1. DNA 2. AIDS
- (iii) State whether the following actions are 'voluntary action, simple reflex or conditioned reflex':
 - 1) Blinking
 - 2) Cleaning the table
 - 3) Playing on the keyboard
 - 4) Salivating when food is put in the mouth [5]

Question 5

(a) Given below is a diagrammatic representation of a defect of the human eye.

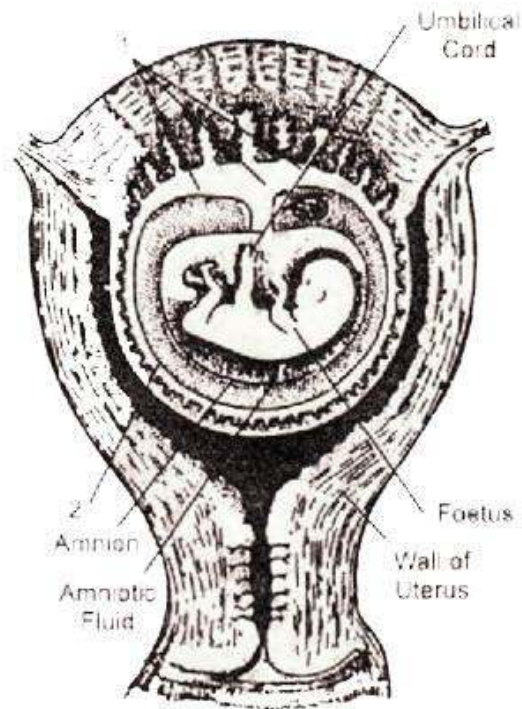


- (i) Identify the defect.
- (ii) Mention two reasons for the above defect.
- (iii) State how the defect can be rectified.
- (iv) Name the part of the eye responsible for maintaining the shape of the eyeball. [5]

(b) Name the hormones which lead to the following conditions:

- (i) Diabetes mellitus
- (ii) Growth of beard in women
- (iii) Myxoedema
- (iv) Gigantism
- (v) Exophthalmic goitre [5]

(a) Study the diagram given below and then answer the questions which follow:



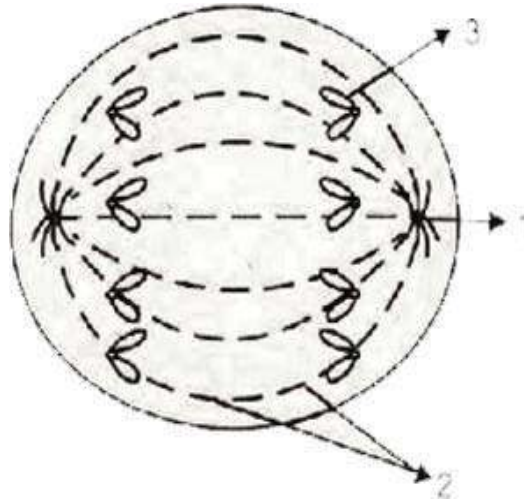
- (i) Name the parts labelled 1 and 2. State the function of each part.
- (ii) State any one function of amniotic fluid.
- (iii) What is the role of the umbilical cord in the development of the foetus?
- (iv) Name the part in the diagram which is endocrine in nature. [5]

(b) State Mendel's law of independent assortment.

- (i) A homozygous tall plant (T) bearing red (R) flowers is crossed with a homozygous dwarf plant (t) bearing white flowers (r):
 - 1) Give the genotype and phenotype of the F1 generation.
 - 2) Give the possible combinations of the gametes which can be obtained from the F1 hybrid.
 - 3) Give the dihybrid ratio and the phenotype of the offspring of the F2 generation when two plants of the F1 generation above are crossed. [5]

Question 7

- (a)** The diagram given below represents a stage during mitotic cell division in an animal cell.



- (i) Identify the stage. Give a reason to support your answer.
- (ii) Name the parts labelled 1, 2 and 3.
- (iii) What is the chromosome number of the cell?
- (iv) Draw a neat, labelled diagram of the cell as it would appear in the next stage.
Name the stage. [5]

(b) Give reasons for the following:

- (i) Plants begin to die when excess of soluble fertilisers are added to the soil.
- (ii) Injury to the medulla oblongata results in death.
- (iii) Gametes have a haploid number of chromosomes.
- (iv) Green leaves are thin and broad.
- (v) Lysosomes are termed suicidal bags of a cell. [5]

Board Paper 2007 - Solution

SECTION I

Answer 1

(a)

- (i) Chloroplasts
- (ii) Demography
- (iii) Alleles
- (iv) Hypertonic solution
- (v) Cerebrospinal fluid (CSF)

(b)

- (i) False.

Correct statement: Mortality is the number of deaths per thousand of the population per year.

- (ii) True.
- (iii) True.
- (iv) True.
- (v) False.

Correct statement: The process of the fusion of the sperm nucleus and the egg nucleus is termed fertilisation.

(c)

Column A	Column B
1. Basic unit of life	D. Cell
2. Beta cells of pancreas	E. Insulin
3. Meiosis	H. Sperm
4. Protective covering of the brain	B. Meninges
5. Constriction of the pupil of the eye	C. Iris

(d)

- (i) Ganong's potometer
- (ii) A potometer does not measure the water loss by transpiration, but it measures the water uptake by the plant. Water absorbed by the plant is not completely lost by transpiration; some of the water is used for cell activities.
- (iii) Transpiration
- (iv) The part marked 'Reservoir' is used to bring the air bubble to its original position. This is done by releasing some water from the reservoir into the capillary tube.
- (v) The movement of the air bubble in the graduated tube gives the volume of water lost in a given time, which is equal to the rate of transpiration of the leafy shoot.

(e)

- (i) The type of lens used to correct myopia is concave.
- (ii) The basic unit of the human brain is the neuron.
- (iii) The end-product of fermentation is ethyl alcohol/lactic acid.
- (iv) A non-degradable pollutant is DDT.
- (v) The period of complete development of the foetus till birth is termed gestation.

(f)

- (i) Leydig cells or interstitial cells
- (ii) Eyebrows
- (iii) Chromosomes
- (iv) Xylem
- (v) Centrosome

(g)

- (i) Tropic hormone – Hormones secreted from the anterior pituitary which stimulate other endocrine glands to produce their specific secretions.
- (ii) Guttation: The exudation of cell sap through specialised openings, i.e. hydathodes present along the margins of leaves.
- (iii) Osmosis: The movement or diffusion of water molecules from a more dilute solution (with low solute concentration) to a less dilute solution (with a higher solute concentration) across a semi-permeable membrane.
- (iv) Stereoscopic vision: Simultaneous focusing of an object in both eyes enables us to perceive the depth and distance of that object. The overlapping of their images in the brain gives a three dimensional effect of the image.
- (v) Mutation: A sudden change in one or more genes or in the number of or in the structure of chromosomes which causes changes in certain traits.

(i) Incorrect term: Ureter, Correct term: Urethra

Seminiferous tubule → Sperm → Sperm duct → Accessory glands → Semen →
Urethra

(ii) Incorrect term: Epidermis, Correct term: Endodermis

Soil water → Root hair → Cells of cortex → Endodermis → Xylem

(iii) Incorrect term: 2 ATP, Correct term: 38 ATP

Oxygen → Stoma → Respiratory cavity → Mesophyll cells → Oxidation of glucose →
38 ATP

(iv) Incorrect term: Auditory nerve, Correct term: Optic nerve

Pupil → Eye lens → Vitreous humour → Fovea → Optic nerve

(v) Incorrect term: Receptor, Correct term: Effector

Sensory nerve → Dorsal root ganglion → Sensory neuron → Motor neuron →
Effector

Answer 2

(a)

(i)

Biofertiliser	Chemical Fertiliser
Azotobacter	Urea

(ii)

Karyokinesis	Cytokinesis
Karyokinesis is the division of the nucleus.	Cytokinesis is the division of the cytoplasm.

(iii)

WHO	Red Cross
WHO collects and supplies information about the occurrence of diseases of epidemic nature.	The Red Cross extends relief and help to the victims of any calamity such as flood, fire, famine, earthquake etc. <u>Q</u>

(iv)

Mitosis	Meiosis
From a single mother cell, two daughter cells are formed.	From a single diploid mother cell, four haploid cells are formed.

(v)

Pure Strains	Hybrid Strains
Strains having two similar alleles for a particular character in a homologous pair are termed pure strains. e.g. TT/tt	Strains having two different alleles for a particular character in a heterozygous pair are termed hybrid strains. e.g. Tt

(b)

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EBC

- (i) Ear ossicles (malleus, incus and stapes): Ear ossicles receive vibrations from the ear drum and magnify them. The vibrations of the stapes are transmitted to the membrane of the oval window.
- (ii) Eustachian tube: The Eustachian tube equalises the air pressure on either side of the ear drum allowing it to vibrate freely.
- (iii) Auditory nerve: The auditory nerve transmits nerve impulses from the cochlea in case of sound and from the semicircular canals in case of balancing to the brain.
- (iv) Function of ear wax:
 - 1) Ear wax has insect repellent properties and hence prevents the entry of insects into the auditory canal. It also prevents the entry of dust particles.
 - 2) It lubricates and protects the ear drum.

Answer 3

(a)

- (i) The overall rise in CO₂ concentration has led to a greater retention of solar radiation in the atmosphere which has resulted in global warming. Therefore, CO₂ is considered as an air pollutant.
- (ii) BCG – Tuberculosis
Salk's vaccine – Poliomyelitis
- (iii) The reasons for high birth rate in India are
 - 1) Many Indians do not accept family planning norms because of strong beliefs in both religious and social customs.
 - 2) Children are considered to be helping hands to increase the family income.
- (iv) Two effects of smog observed in major cities:
 - 1) Smog decreases visibility which disrupts the smooth movement of road, rail and air traffic.
 - 2) It causes health problems such as bronchitis and asthma.

(b)

- (i) The tube carrying air in flask A is not dipped into the solution of lime water. The limb of the air pump in flask B is not dipped into the solution of lime water.
- (ii) Soda lime absorbs CO₂ present in the incoming air.
- (iii) The purpose of using lime water in flask A:
The incoming air is passed through soda lime, which absorbs CO₂ from it. The lime water in flask A thus does not turn milky, which gives the indication of CO₂ being completely absorbed by the soda lime. Thus, CO₂-free air is supplied to the plant.
The purpose of using lime water in flask B:
As the air passes into flask B, the reaction of lime water with CO₂ turns it milky which indicates that CO₂ is produced by the plant during the experiment.

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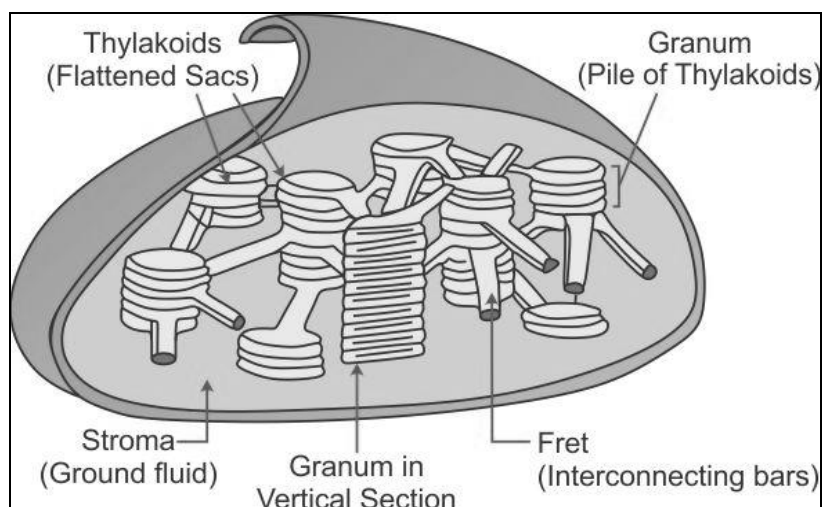


Answer 4

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(i) Structure of the chloroplast:



(ii) The photochemical phase of photosynthesis is light dependent. A series of chemical reactions occur in quick succession initiated by light; therefore, the phase is called the photochemical phase. It takes place in the chlorophyll-containing thylakoids of the chloroplast.

It occurs in the following steps:

- 1) Activation of chlorophyll: On exposure to light, chlorophyll becomes excited and absorbs photons (a photon is the smallest unit of light energy) to get activated.
- 2) Photolysis of water: The energy absorbed is used in the splitting of water molecules into hydrogen ion (H^+) and hydroxide ion (OH^-). During this process, electrons are released.
$$2H_2O \rightarrow 4H^+ + O_2 + 4e^-$$
- 3) Production of the reducing agent: NADP, i.e. nicotinamide dinucleotide phosphate, picks up the hydrogen ion and is reduced to NADPH.
$$NADP + e^- + H^+ \rightarrow NADPH$$
- 4) Formation of molecular oxygen: Hydroxide ion is oxidised to hydrogen peroxide which decomposes to form molecular oxygen (O_2). Molecular oxygen is released during photosynthesis.
$$2O \rightarrow O_2$$
- 5) Photophosphorylation: Electrons are used to convert ADP (adenosine diphosphate) into an energy-rich compound ATP.
$$ADP + \text{Phosphate} \rightarrow ATP$$

(inorganic)

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(iii)

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- 1) I would select white light because photosynthesis is maximum in white light, while it is minimum in green light as green light is reflected by green plants.
 - 2) I would select a destarched plant because during the experiment, any starch formed in the leaf will indicate that the starch is synthesised by the plant during photosynthesis by using light.

(b)

- (i) Reflex Action: An autonomic, quick and involuntary action in the body brought about by a stimulus is called reflex action.
- (ii) 1. DNA – Deoxyribonucleic acid
2. AIDS – Acquired immunodeficiency syndrome
- (iii)

Blinking	Simple reflex
Cleaning the table	Voluntary action
Playing on the keyboard	Conditioned reflex
Salivating when food is put in the mouth	Simple reflex

Answer 5

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EBC

- (i) Hypermetropia (far-sightedness) is the defect because in the diagram the image is formed behind the retina.
- (ii) Reasons for hypermetropia are
 1. Shortening of the eye ball from front to back.
 2. The lens becomes too flat.
- (iii) It can be rectified by using a convex lens of appropriate power (focal length).
- (iv) Vitreous chamber

(b)

- (i) Insulin
- (ii) Cortisone (androgen)
- (iii) Thyroxine
- (iv) Growth hormone (GH)
- (v) Thyroxine

Answer 6

(a)

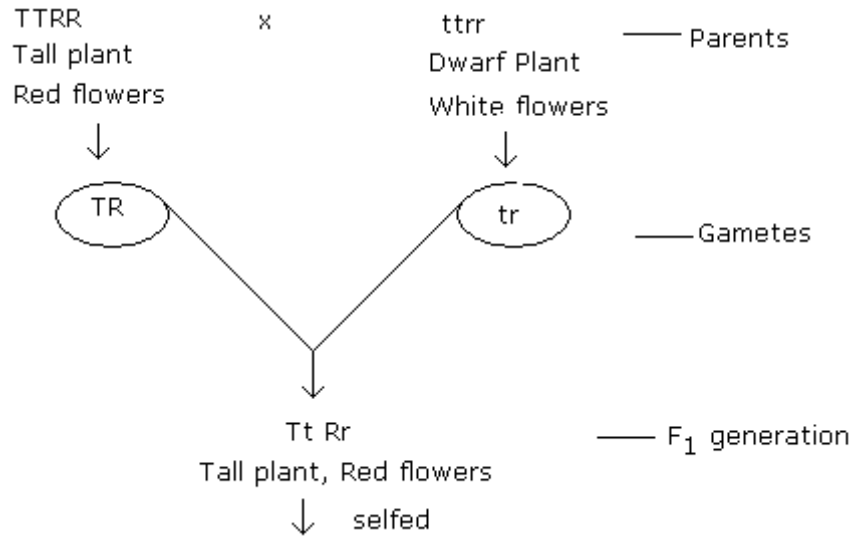
- (i) 1. Placenta – It helps in supplying oxygen and nutrients to the embryo and, at the same time, it also carries excretory substances from the foetus to the mother's blood.
2. Chorion – It forms the placenta.
- (ii) Amniotic fluid acts as a shock absorber and protects the embryo against mechanical jerks or blows which may strike the mother's body.
- (iii) The umbilical cord contains blood vessels which connect the placenta with the foetus.
It transports the nutrients and O_2 from the mother's blood to the foetus and removes CO_2 and excretory wastes from the foetus' blood into the mother's blood. Thus, it acts as a transport channel between the foetus and the mother's blood.
- (iv) Placenta.

(b)

(i) Mendel's law of independent assortment:

In a dihybrid cross, the distribution of the members of one pair into the gametes is independent of the distribution of the other pair.

(ii)

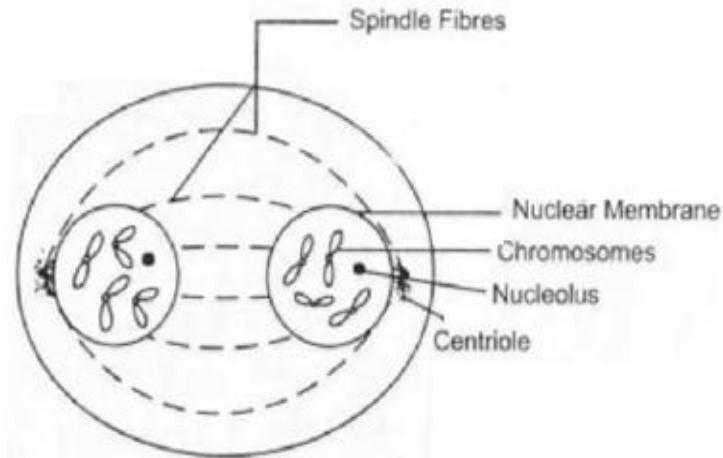


♂	TR	Tr	tR	tr	
♀	TR	TTRR	TTRr	TtRR	TtRr
	Tr	TTRr	TTrr	TtRr	Ttrr
	tR	TtRR	TtRr	ttRR	ttRr
	tr	TtRr	Ttrr	ttRr	ttrr

- 1) Genotype of F₁ generation: Heterozygous tall plants with red flowers (TtRr)
Phenotype: Tall plants with red flowers
- 2) Gametes from F₁ hybrid – TR, Tr, tR, tr
- 3) Dihybrid ratio = 9:3:3:1.
Tall plant bearing red flowers = 9
Tall plant bearing white flowers = 3
Dwarf plant bearing red flowers = 3
Dwarf plant bearing white flowers = 1

(a)

- (i) Anaphase of mitosis, because the chromatids are moving towards the opposite poles.
- (ii) 1. Centriole
2. Spindle fibres
3. Chromatid
- (iii) Four
- (iv) Telophase: The stage which comes after anaphase



(b)

- (i) Excess application of soluble fertilisers in the soil makes the soil solution hypertonic as compared to the cell sap, and exosmosis takes place. Plants suffer water loss. Therefore, plants begin to die when excess of soluble fertilisers are added to the soil.
- (ii) The medulla oblongata controls involuntary functions such as heart beat, rate of respiration, secretion of saliva, gut peristalsis etc. Injury to the medulla oblongata may stop important activities such as heart beat, respiration etc. This results in death.
- (iii) Gametes are produced as a result of meiosis during which the chromosome number is reduced to half and each daughter cell receives half the set of chromosomes. Therefore, gametes have a haploid number of chromosomes.
- (iv) Due to their broad surface areas, green leaves can absorb more sunlight at a given time, and due to the thinness of the leaves, the light energy can easily penetrate the leaf surface and be trapped by the chloroplasts. This makes photosynthesis efficient. Therefore, green leaves are thin and broad.
- (v) Lysosomes contain digestive enzymes known as lysozymes. When the cell gets damaged or old, lysosomes burst to release lysozyme to digest their own cell.

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