



Previous Year Solved Question Papers of

ICSE Class 10 Exams

BIOLOGY - 2008

Original Question Paper + Answer Key

(ICSE)

**INDIAN CERTIFICATE OF
SECONDARY EDUCATION**



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Board Paper 2008
(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) A membrane which disappears during late prophase.
- (ii) A fluid which occupies the larger cavity of the eyeball behind the lens.
- (iii) The ground substance present in a chloroplast.
- (iv) A specific part of a chromosome which determines hereditary characteristics.
- (v) A neurotransmitter stored at the terminal end of the axon. [5]

(b) The following paragraph is related to absorption of water from the soil. Copy and complete the following paragraph by selecting the correct words from those given in the box. You may **use** the term only once.

Exosmosis, Hypertonic, Osmosis, Isotonic, Hypotonic, Cortical, Endosmosis

Water enters the root hair from the soil by the process of _____. This is because the solution in the soil is _____, whereas the cell sap in the root hair cell is _____. The water then passes through the _____ cells by cell to cell _____ and reaches the xylem of the root. [5]

- (c)** Given below are sets of 5 terms each. **Without changing the first term**, rearrange the remaining four, so as to be in logical sequence as per the directions given in brackets for each. One has been done for you as an example.

Example: **Pathogen**, active immunity, produces antibodies,
lymphocytes, antigen (defence mechanism of the body)

Answer: Pathogen → antigen → lymphocytes → produces antibodies → active immunity

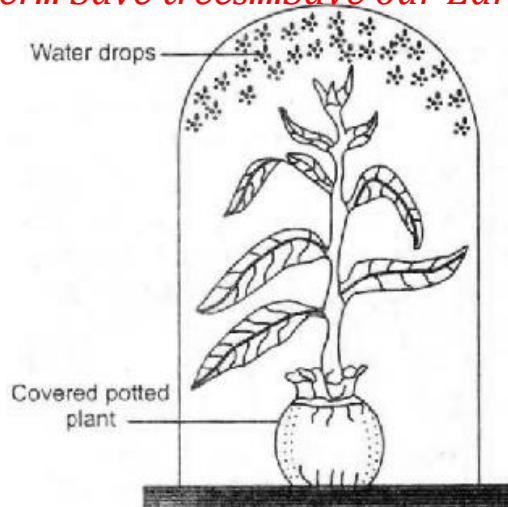
- (i) **Destarched plant**, iodine added, washed in water, a leaf boiled in alcohol, placed in sunlight (testing for presence of starch)
- (ii) **Interphase**, Anaphase, Prophase, Telophase, Metaphase (sequential stages in karyokinesis)
- (iii) **Seminiferous tubule**, penis, urethra, epididymis, vas deferens (course of passage of sperms in man)
- (iv) **Pinna**, cochlea, tympanum, ear ossicles, auditory canal (route through which vibrations of sound enter the ear)
- (v) **Soil water**, xylem, cortex, endodermis, root hair (conduction of water) [5]
- (d)** State whether the following statements are **True** or **False**. If **False**, rewrite the correct form of the statement by only changing the last word of the statement.
- (i) The alpha cells of the pancreas secrete insulin.
- (ii) Duplicated chromosomes remain attached at a point termed centrosome.
- (iii) The number of pairs of autosomes in man is 22.
- (iv) Penicillin obtained from a fungus is an example of an antibody.
- (v) Plants which manufacture their own food are termed heterotrophs. [5]

- (e)** Given below is an example of a particular structure and its special functional activity, e.g. Glomerulus and ultrafiltration. On a similar pattern, complete the following:
- (i) Corpus luteum and ____.
- (ii) Iris of the eye and ____.
- (iii) Seminal vesicle and ____.
- (iv) Phloem and ____.
- (v) Eustachian tube and ____.
- [5]

(f) Given below is an experimental setup to study a particular process.

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- (i) Name the process being studied.
- (ii) Explain the process named in (i) above.
- (iii) Why is the pot covered with a plastic sheet?
- (iv) Mention one way in which this process is beneficial to the plant.
- (v) Suggest a suitable control for this experiment. [5]

(g) Given below are incomplete explanations of certain biological processes/terms where a key word has been left out. **Rewrite** the completed explanation by **inserting** the key word in the space indicated by '^'.

- (i) Birth rate is the number of '^' births per thousand of the population per year.
- (ii) Photolysis is the splitting of water molecules into hydrogen ions and hydroxyl ions in the presence of '^' and light.
- (iii) Vaccine is a preparation consisting of '^' microbes which help to build immunity in the human body.
- (iv) Osmosis is the movement of water molecules from its region of high concentration to its region of low concentration through a '^' membrane.
- (v) Antiseptics are chemical substances applied to the '^' to destroy or prevent the growth and multiplication of harmful microbes. [5]

(h) Briefly explain the following terms:

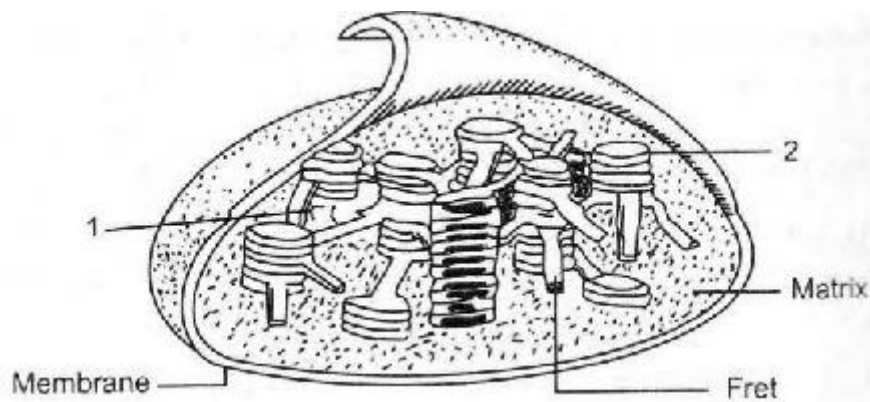
- (i) Destarched plant
- (ii) Phenotype
- (iii) Death rate
- (iv) Power of accommodation of the eye
- (v) Natural immunity [5]

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Question 2

- (a) Given below is a diagrammatic representation of the internal structure of an organelle found in a plant cell. Study the same and then answer the questions which follow.



- (i) Identify the organelle.
- (ii) Name the physiological process occurring in this organelle.
- (iii) Mention one way in which this process is beneficial to man.
- (iv) Name the phases of the process occurring in the part labelled '1' and '2'.
- (v) A chemical substance 'NADP' plays an active part in one of the phases. Give the expanded form of NADP and state its role in the above process.
- (vi) Represent the physiological process mentioned in (ii) above in the form of a chemical equation. [5]

- (b) Give the technical/biological term for the following:

- (i) Onset of menstruation in a young girl around the age of 13 years.
- (ii) Eye defect occurring in old people whereby they are unable to see near objects.
- (iii) The mucous membrane lining the uterus.
- (iv) The process of conversion of ADP to ATP during the first phase of photosynthesis.
- (v) The point of contact between two neurons.
- (vi) Protective membranes covering the human brain and spinal cord.
- (vii) Respiratory openings found on the stem of woody plants.
- (viii) The process by which white blood cells engulf harmful microbes.
- (ix) The process of mixing of two different substances/molecules.
- (x) Exudation of sap from the injured parts of the plant. [5]

Question 3

- (a)** Draw a diagram of the human eye as seen in a vertical section and label the part which suits the following functions/descriptions:
- (i) The layer which prevents the reflection of light.
 - (ii) The structure which alters the focal length of the lens.
 - (iii) The region of distinct vision.
 - (iv) The part which transmits the impulse to the brain.
 - (v) The outermost transparent layer in front of the eye lens.
 - (vi) The fluid present in the anterior part of the eye in front of the eye lens. [5]

- (b)** Complete the following table by filling in the blanks 1 to 10 with the appropriate terms:

GLAND	SECRETION	FUNCTION/EFFECT ON BODY
1	Testosterone	2
Adrenal	3	4
5	6	Influences metabolism of cells
Lachrymal	7	8
9	Growth hormone	10

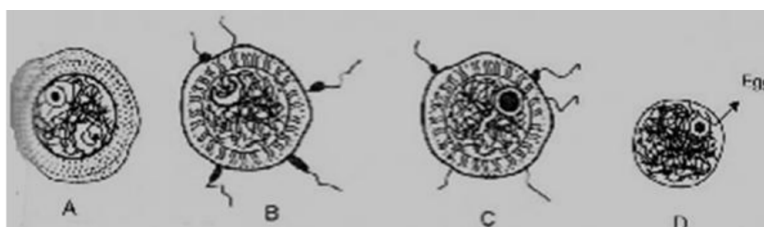
[5]

Question 4

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- (a) Given below are diagrams showing different stages in the process of fertilisation of an egg in the female reproductive tract.



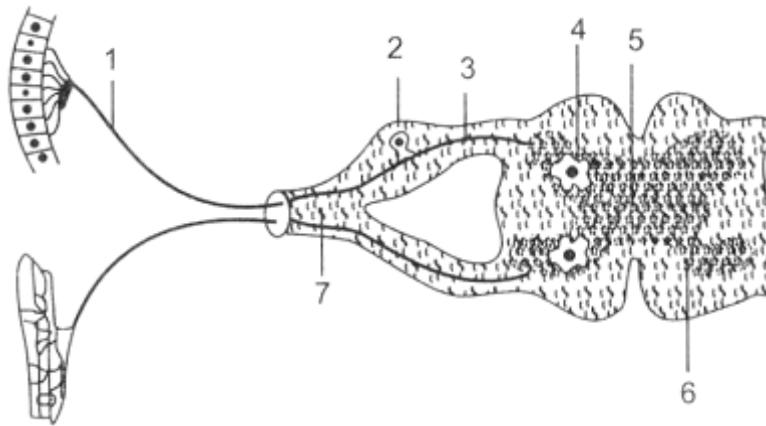
- (i) Use the letters given below each diagram to show the correct order in the process of fertilisation.
- (ii) Where in the female reproductive system does this process normally take place?
- (iii) What is the biological term for the product of fusion?
- (iv) What is the chromosome number of (1) the egg (2) the fused product?
- (v) Draw a neat labelled diagram of a mature human sperm. [5]
- (b)** Differentiate between the following on the basis of what is given in brackets:
- (i) Myopia and hypermetropia (condition of eyeball)
- (ii) Rods and cones (pigment present)
- (iii) Tonoplast and plasma membrane (location)
- (iv) Wall pressure and turgor pressure (explain briefly)
- (v) DPT and BCG (expanded form of the vaccine) [5]

Question 5

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(a) The diagram given below depicts the cross section of the spinal cord. Study the same and then answer the questions which follow:



- (i) Name the process which is being depicted.
- (ii) Name the parts labelled 2, 5 and 6.
- (iii) Name the cells in contact with the part labelled '1'.
- (iv) What is the function of the parts labelled 3, 4 and 7? What is the technical term given to the pathway represented by 3, 4 and 7?
- (v) How does the arrangement of cells in the spinal cord differ from that in the brain?

[5]

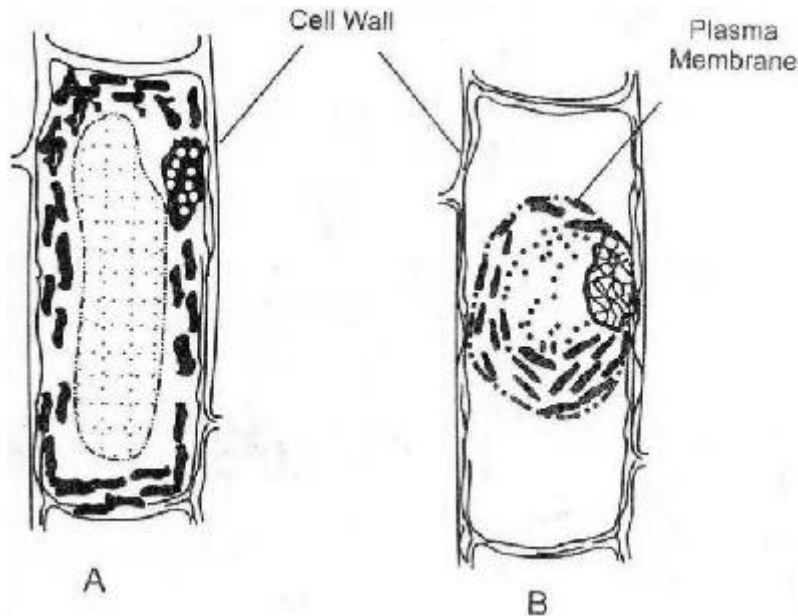
(b)

- (i) Mention any three functions of the Red Cross.
- (ii) Name any two microbes which cause diseases in man. In each case, give an example of disease caused by them.
- (iii) Mention three reasons why the growth of population has not been appreciably checked in India.

[5]

Question 6

- (a) Given below are diagrams of plant cells as seen under the microscope after having been placed in two different solutions.



- (i) What is the technical term for the condition of
1. Cell A 2. Cell B
- (ii) From the solutions given in brackets (water, strong sugar solution, 1% salt solution), name the solution into which
1. Cell A and 2. Cell B was placed before being viewed under the microscope.
- (iii) Under what conditions in the soil will the root hair cell resemble 1. Cell A and
2. Cell B?
- (iv) Name the pressure responsible for the movement of water from the root hair cell to the xylem of the root. How is it set up?
- (v) Name the pressure which helps in the movement of water up the xylem of the root.
- [5]

(b)

- (i) Explain the following terms:
(1) Mutation (2) Homologous chromosomes (3) Alleles
- (ii) Give the dihybrid ratio. Name and state the law which explains the same.
- (iii) Mention three main reasons for the sharp rise in 'human population' in the world.
- [5]

Question 7

(a)

(i) Draw a diagram of the nucleus of a cell, having chromosome number 6, as it would appear in the metaphase stage of mitosis and label the following parts in the diagram:

- | | |
|--------------|-----------------------|
| 1. Aster | 2. Achromatic spindle |
| 3. Chromatid | 4. Centromere |

(ii) Mention the difference between mitosis and meiosis with reference to

1. Number of daughter cells formed at the end of the division.
2. The chromosome number of the daughter cells formed.

[5]

(b) Account for the following briefly:

(i) The pituitary gland is known as the 'master gland'.

(ii) Animals owe their existence to chlorophyll.

(iii) Twins may or may not be identical.

(iv) Herbaceous plants growing in well-watered soils are found to wilt on a hot day.

(v) Throat infections can lead to ear infections.

[5]

Board Paper 2008 - Solution

SECTION I

Answer 1

(a)

- (i) Nuclear membrane
- (ii) Vitreous humour
- (iii) Stroma
- (iv) Gene
- (v) Acetylcholine

(b) Water enters the root by the process of **endosmosis**. This is because the solution in the soil is **hypotonic**, whereas the cell sap in the root hair cell is **hypertonic**. The water then passes through the **cortical** cells by cell to cell **osmosis** and reaches the xylem of the root.

(c)

- (i) Destarched plant → placed in sunlight → a leaf boiled in alcohol → washed in water → iodine added
- (ii) Interphase → Prophase → Metaphase → Anaphase → Telophase
- (iii) Seminiferous tubules → epididymis → vas deferens → urethra → penis
- (iv) Pinna → auditory canal → tympanum → ear ossicles → cochlea
- (v) Soil water → root hair → cortex → endodermis → xylem

(d)

(i) False.

Correct statement: The alpha cells of the pancreas secrete **glucagon**.

(ii) False.

Correct statement: Duplicated chromosomes remain attached at a point termed **centromere**.

(iii) True.

(iv) False.

Correct Statement: Penicillin obtained from a fungus is an example of an **antibiotic**.

(v) False.

Correct Statement: Plants which manufacture their own food are termed **autotrophs**.

- (i) Corpus luteum and **progesterone**.
- (ii) Iris of the eye and control **amount of light entering the eye**.
- (iii) Seminal vesicle and **produce secretions for the transport of sperms**.
- (iv) Phloem and **transports food from the leaves to the other parts of plant**.
- (v) Eustachian tube and **equalises air pressure on both sides of the ear drum**.

(f)

- (i) Transpiration.
- (ii) **Transpiration:** It is the process in which water in the form of water vapour is lost from the aerial parts of the plant such as the leaves and soft stems of the plant. Only a small quantity of water absorbed by the roots is actually used by the plant body. The rest of the water is lost through transpiration. Transpiration helps to cool the plant body. It also helps to regulate the temperature of the surrounding area.
- (iii) The plastic sheet will prevent the escape of water vapour from the pot which will help to carry out the experiment without any errors.
- (iv) Transpiration creates a suction force and thus helps in the ascent of sap in the plant. Increased transpiration results in more water and minerals being absorbed from the soil by the root hair cells.
- (v) A suitable control for this experiment would be a pot without a plant covered with a plastic sheet and kept in the bell jar.

(g)

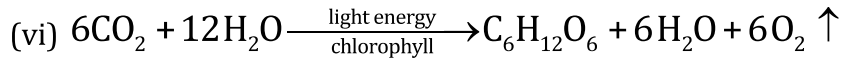
- (i) Birth rate is the number of **live** births per thousand of the population per year.
- (ii) Photolysis is the splitting of water molecules into hydrogen ions and hydroxyl ions in the presence of **chlorophyll** and light.
- (iii) A vaccine is the preparation consisting of **dead** or **weakened** microbes which help to build immunity in the human body.
- (iv) Osmosis is the movement of water molecules from its region of high concentration to its region of low concentration through a **semi-permeable** membrane.
- (v) Antiseptics are chemical substances applied on **the body (skin)** to destroy or prevent the growth and multiplication of harmful microbes.

(h)

- (i) Destarched plant: A destarched plant is a plant which has no stored starch available in its body. Its leaves will not show the presence of starch. Usually a plant is destarched before the experiment by keeping it in the dark for 24–48 hours.
- (ii) Phenotype: The external, observable characters in the body controlled by genes are called the phenotype.
- (iii) Death rate: It is the number of deaths per thousand of population per year.
- (iv) Power of accommodation of the eye: It is the ability of the eye to focus at nearby and far off objects clearly.
- (v) Natural immunity: It is the immunity which one inherits from one's parents. It is by virtue of the genetic constitution of the body.

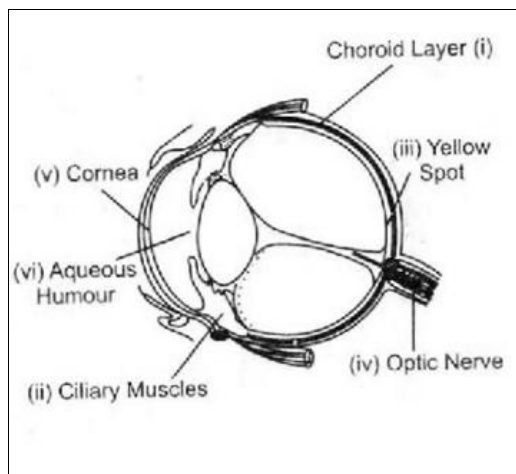
Answer 2**(a)**

- (i) Chloroplast
- (ii) Photosynthesis
- (iii) Photosynthesis provides food to all mankind indirectly.
- (iv) 1 – Light independent reaction
2 – Light dependent reaction
- (v) **NADP**: Nicotinamide adenine dinucleotide phosphate
It traps the hydrogen ions formed during the photolysis of water and gets reduced to NADPH. The hydrogen of NADPH is used to combine with CO₂ by utilising energy to produce glucose.

**(b)**

- (i) Menarche
- (ii) Presbyopia
- (iii) Endometrium
- (iv) Photophosphorylation
- (v) Synapse
- (vi) Meninges
- (vii) Lenticels
- (viii) Phagocytosis
- (ix) Diffusion
- (x) Bleeding

(a) Structure of the human eye:

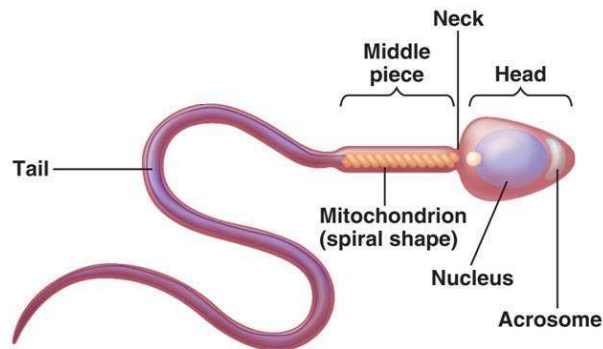


(b)

GLAND	SECRETION	FUNCTION/EFFECT ON BODY
(1) Testes	Testosterone	(2) Development of secondary sexual characters in males
Adrenal	(3) Adrenaline	(4) Increases heart beat, rate of breathing etc.
(5) Thyroid gland	(6) Thyroxine	Influences metabolism of cells
Lachrymal	(7) Tears	(8) Lubricates and cleans the surface of the eye
(9) Pituitary gland	Growth hormone	(10) Controls the growth of the body

(a)

- (i) D, B, C, A
- (ii) In the oviduct/fallopian tube
- (iii) Zygote
- (iv) 1. Chromosome number of the egg = 23
2. In the fused product (zygote) = 46
- (v) A mature human sperm:



(b)

(i)

Myopia	Hypermetropia
In myopia, the eyeball is lengthened from front to back.	In hypermetropia, the eyeball is shortened from front to back.

(ii)

Rods	Cones
Rhodopsin is present in rods.	Iodopsin is present in cones.

(iii)

Tonoplast	Plasma membrane
Tonoplast is the membrane around the vacuole which is present in the cell.	Plasma membrane is the membrane around the cytoplasm and thus covers the entire cell.

(iv)

Wall Pressure	Turgor Pressure
Wall pressure is the pressure exerted by the cell wall on its contents.	Turgor pressure is the pressure exerted by the cell contents on the cell wall.

DPT	BCG
Diphtheria, Pertussis, Tetanus	Bacillus of Calmette and Guerin

Answer 5

(a)

- (i) Nervous pathway and spinal reflex
- (ii) 2. Cell body of sensory neuron
5. Central canal
6. Grey matter
- (iii) Receptor cells (skin cells)
- (iv) 3 – (Sensory neuron) carries sensory impulses from the receptor towards the spinal cord.
4 – (Association neuron) receives impulses from 3 and passes them to the motor neuron.
7 – (Motor nerve) carries response impulses towards the effector organs.

The technical term given to the pathway represented by 3, 4 and 7 is **reflex arc**.

- (v) In the spinal cord, the cell bodies of neurons lie on the inner side, i.e. grey matter, and the axons of neurons lie in the outer region, i.e. white matter. In the brain, the arrangement is exactly opposite. The grey matter lies outside and the white matter lies on the inner side.

(b)

(i) Functions of the Red Cross:

- 1. The Red Cross provides relief and help to the victims of natural calamities such as floods, earthquakes, fires etc.
- 2. It procures and supplies blood to the needy victims of war.
- 3. It is engaged in training mid-wives.
- 4. It arranges ambulance services in all emergencies.

(ii) Bacteria – Tuberculosis

Virus – AIDS

(iii) The growth of population has not been appreciably checked in India because of the following reasons:

- 1. Most of the rural population is illiterate and ignorant which makes them unaware about the importance of a small family.
- 2. Most of the Indian families hold the view that the male child is essential for the family.
Therefore, till they get a son, such families keep having several children.
- 3. Our religious and social customs are such that most people do not accept family

(a)

- (i) 1. Turgid cell 2. Plasmolysed cell
- (ii) 1. Water 2. 1% salt solution
- (iii) 1. The root hair cell will resemble cell A when the soil is well watered.
2. The root hair cell will resemble cell B when there is a high concentration of fertiliser in the soil and less water in it.
- (iv) Root Pressure: Root pressure is responsible for the movement of water from the root hair cell to the xylem of the root. It is built up by endosmosis in the root hair cells and cell to cell osmosis in the cortex cells which push water into the xylem.
- (v) Transpirational pull

(b)**(i)**

- 1. 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 is called a mutation.
- 2. Homologous chromosomes: Homologous chromosomes are a pair of corresponding chromosomes of the same shape, size and length (but not identical) containing the same genes in the same order, one from each parent.
- 3. Alleles: The alternative forms of a gene responsible for the alternative forms of a character occupying the same position on homologous chromosomes are called alleles.

(ii) Dihybrid ratio: 9:3:3:1

The law of independent assortment explains it.

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.

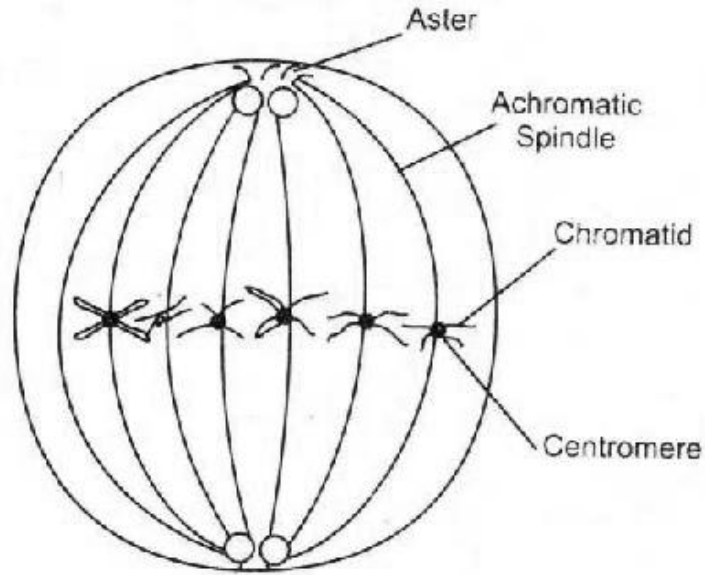
(iii) Reasons for the sharp rise in human population in the world are as follows:

- 1. Better health care is available for all age groups. There are advanced facilities, doctors and medicines available for medical treatments.
- 2. Food shortage has been overcome due to the Green Revolution. Better quality food is produced and is available to all.
- 3. There are now fewer deaths as compared to ancient times. This is because of the discovery of medicines and vaccines which have controlled and even wiped out many diseases. More patients get cured and live longer.

Answer 7

(a)

(i) Metaphase:



(ii) Difference between mitosis and meiosis:

Mitosis	Meiosis
1. In mitosis, the number of daughter cells formed at the end of the division is 2.	1. In meiosis, the number of daughter cells formed at the end of the division is 4.
2. The chromosome number of the daughter cells is 46.	2. The chromosome number of the daughter cells is 23.

(b)

- (i) The pituitary gland controls the secretions of all the other endocrine glands of the body by producing tropic hormones. Therefore, the pituitary gland is known as the 'master gland'.
- (ii) Plants produce their own food by using light and chlorophyll. The herbivores directly eat plants. The carnivorous animals feed on the herbivores. Thus, all types of animals, including man, depend on plants directly or indirectly for food. Therefore, animals owe their existence to chlorophyll.
- (iii) Sometimes, two eggs are released from the ovaries at a time and both may get fertilised by two different sperms. Such twins are dizygotic and not identical. Sometimes, a single fertilised egg may split during the early stages of cell division. Such twins are monozygotic and are identical. Therefore, twins may or may not be identical.
- (iv) On a hot day, herbaceous plants wilt even in well watered soil because their rate of transpiration exceeds the rate of water absorption by the roots. Due to less water in the cells, they become flaccid and leaves become soft and wilt.
- (v) The Eustachian tube is the part of the middle ear. It also connects the cavity of the middle ear to the throat. Hence, throat infections can lead to ear infections.

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