Class XI Session 2025-26
Subject - Biology
Sample Question Paper - 7

Time Allowed: 3 hours **Maximum Marks: 70**

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. If kidney tissues are supplied with blood low in oxygen then: **[1]**

   a) Both tubular reabsorption and ultrafiltration stops
   b) Tubular reabsorption stops
   c) Both tubular reabsorption and ultrafiltration continue normally
   d) Ultrafiltration stops

2. Which is the topmost taxa in zoology? **[1]**

   a) Phylum
   b) Division
   c) Order
   d) Kingdom

3. Amino acids are also known as: **[1]**

   a) δ - amino acid
   b) β -amino acid
   c) γ -amino acid
   d) α -amino acid

4. Which part of the respiratory tract functions as sound box? **[1]**

   a) Trachea
   b) Bronchi
   c) Larynx
   d) Pharynx

5. Bulliform or motor cells are present in **[1]**

   a) Isobilateral leaves of monocot
   b) Unifacial leaves of monocot
   c) Dorsiventral leaves of dicot
   d) Dorsiventral leaves of monocot

6. As compared to sun plants, plants adapted to low light intensity possess: **[1]**

a) Larger photosynthetic unit
b) Spiny leaves
c) High rate of CO_2 fixation
d) More extended root system

7. The condition of accumulation of urea in the blood is termed as: **[1]**

a) Renal Calculi
b) Ketonuria
c) Uremia
d) Glomerulonephritis

8. A farmer grows cucumber plants in his field. He wants to increase the number of female flowers in them. Which plant hormones can be applied to achieve this? **[1]**

a) Auxins
b) Abscisic acid
c) Ethylene
d) Gibberellins

9. Frog shows which kind of excretion? **[1]**

a) Ammonotelic in water and ureotelic on land
b) Ammonotelic
c) Ureotelic
d) Uricotelic

10. In mosses, the sex organs arise from: **[1]**

a) Capsule
b) Foot
c) Leaf apex
d) Setae

11. The epithelial cells of Bowman's capsule are called: **[1]**

a) Filtration slits
b) Calyces
c) Podocytes
d) Slit pores

12. Where does the exchange of gases take place in the respiratory system? **[1]**

a) Alveoli
b) Pulmonary Artery
c) Bronchioles
d) Bronchi

13. **Assertion (A):** Yeasts are holocarpic. **[1]**
Reason (R): They form pseudomycelium.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

14. **Assertion (A):** Enzymes of glycolysis are constitutive enzymes. **[1]**
Reason (R): They are present over mitochondrial cristae.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

15. **Assertion (A):** Receptors associated with the aortic arch and carotid artery also can recognize changes in CO_2 and H^+ concentration. **[1]**
Reason (R): It sends necessary signals to the rhythm centre for remedial actions.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

16. **Assertion (A):** Erythrocytes can carry out anaerobic metabolism only. **[1]**

Reason (R): In erythrocytes, carbon-dioxide is converted into bicarbonates.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

17. How are open Vascular bundles differ from closed vascular bundles? **[2]**

18. Mention any four activities regulated by the estrogen hormone. **[2]**

19. Draw a well labelled diagram of both ventral and dorsal views of the brain of the frog. **[2]**

20. Define a taxon. Give some examples of taxa at different hierarchical levels. **[2]**

21. Why is the colour of a leaf kept in the dark frequently yellow, or pale green? Which pigment do you think is more stable? **[2]**

OR

Mention the four basic requirements for chemiosmosis to occur.

Section C

22. Why Limulus is called living fossil? How does excretion and respiration occur in it? Give its well-labelled diagram. **[3]**

23. Differentiate between the following: **[3]**

i. Red algae and brown algae

ii. Liverworts and moss

iii. Homosporous and heterosporous pteridophyte

24. What are Lipids? Explain. **[3]**

25. Differentiate between Protoplasmic and Apoplasmic substances. **[3]**

26. Write the features that distinguish between the two open and closed circulatory system. **[3]**

OR

Differentiate between right ventricle and left ventricle.

27. Mention and explain the special properties of muscle. **[3]**

28. Describe the protective coverings of the brain. **[3]**

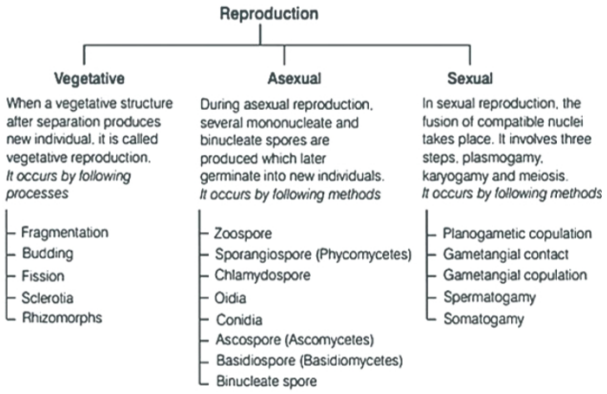
Section D

29. **Read the following text carefully and answer the questions that follow:** **[4]**

The fungi constitute a unique kingdom of heterotrophic organisms. They show a great diversity in morphology and habitat. Fungi are cosmopolitan and occur in air, water, soil, and on animals and plants. They prefer to grow in warm and humid places. Most fungi are heterotrophic and absorb soluble organic matter from dead substrates and hence are called saprophytes. When a fungus reproduces sexually, two haploid hyphae of compatible mating types come together and fuse. In some fungi, the fusion of two haploid cells immediately results in diploid cells (2n). The fungiform fruiting bodies in which reduction division occurs, leading to the formation of haploid

spores. Symbionts - in association with algae as lichens and with roots of higher plants as mycorrhiza.

Three types of reproduction occur in fungi



i. Observe the given flow chart of reproduction and mention which steps involves in the sexual cycle of fungi. (1)

ii. What is Rhizopus? Also, mention Rhizopus - wheat rush a correct match? (1)

iii. What is Mycorrhiza? And mention its function. (2)

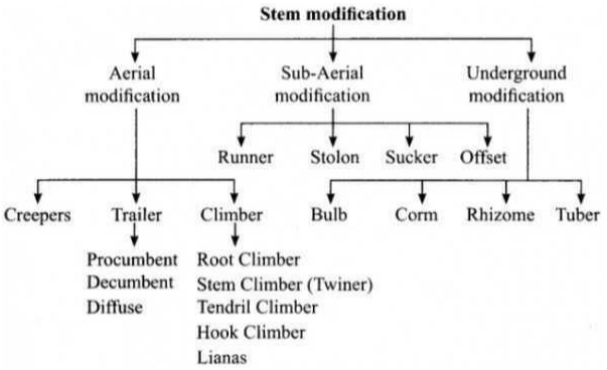
OR

In which form Fungi Stores Food Material? Do fungi have food vacuoles? (2)

30. **Read the following text carefully and answer the questions that follow:** **[4]**

Various parts of the plant such as stems leaves, and even fruits are modified into underground parts to perform various functions such as stems, leaves, and even fruits.

The stems in ginger and banana are underground and swollen due to storage of food. They are called rhizome. Rhizome of ginger is a modification of stem because it bears nodes, internodes, terminal buds, scaly leaves and buds, which give rise to aerial shoots. It is not a root because root does not have nodes and internodes. Also, rhizome does not perform the function of roots i.e. anchorage and absorption, rather it serve as reservoir for storage of food. Similarly, corm is an underground stem in Colocasia (jimikand) The tips of the underground stem in potato become swollen due to accumulation of food and forms tuber.



i. Observe the given flow chart and mention what are the four types of Underground stem modification also mention one example of each. (1)

ii. Ginger is an underground stem but why it is distinguished from a root? (1)

iii. Why do the tips of modified stems in potatoes become swollen? (2)

OR

Are all underground parts of a plant roots? (2)

Section E

31. Enumerate the assumptions that we undertake in making the respiratory balance sheet. Are these assumptions valid for a living system? Compare fermentation and aerobic respiration in this context. **[5]**

OR

Where is the electron transport system operative in mitochondria? Explain the system highlighting the role of oxygen.

32. Write the functions of the following **[5]**

i. Centromere

ii. Cell wall

iii. Smooth ER

iv. Golgi Apparatus

v. Centrioles

OR

Give the biochemical composition of plasma membrane. How are lipid molecules arranged in the membrane?

33. Describe the following: **[5]**

i. synapsis

ii. bivalent

iii. chiasmata

Draw a diagram to illustrate your anwer.

OR

A well-known biologist stated that the life history of an organism can be summed up as gametic fusion, equational division and reductional division. Comment on it.

Solution

Section A

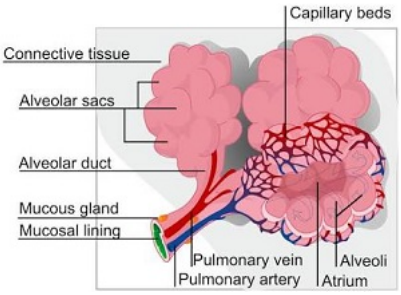
1. **(a)** Both tubular reabsorption and ultrafiltration stops
   Explanation:
   Both tubular reabsorption and ultrafiltration stops
2. **(d)** Kingdom
   Explanation:
   Kingdom
3. **(d)** α -amino acid
   Explanation:
   Amino acids share a basic structure, which consists of a central carbon atom, also known as the alpha (α) carbon.
4. **(c)** Larynx
   Explanation:
   The voice box, sound box or larynx, is the portion of the respiratory (breathing) tract containing the vocal cords which produce sound.
5. **(a)** Isobilateral leaves of monocot
   Explanation:
   Bulliform cells or motor cells are large, bubble-shaped epidermal cells that occur in groups on the upper surface of the leaves of many monocots on the upper surface of the leaf.
6. **(a)** Larger photosynthetic unit
   Explanation:
   The plants adapted to low light intensity for photosynthesis contain a larger amount of photosynthetic units as compared to sun plants.
7. **(c)** Uremia
   Explanation:
   Malfunctioning of kidneys can lead to accumulation of urea in blood, a condition called uremia, which is highly harmful and may lead to kidney failure.
8. **(c)** Ethylene
   Explanation:
   Ethylene promotes female flowers in cucumbers thereby increasing the yield.
9. **(c)** Ureotelic
   Explanation:
   Excretion of urea as metabolic waste is known as Ureotelism. Animals secreting urea are called ureotelic. Frog is ureotelic.
10. **(c)** Leaf apex

Explanation:
In sexual reproduction, the sex organs antheridia and archegonia are produced at the apex of the leafy shoots.

11.

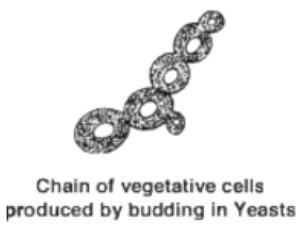
(c) Podocytes
Explanation:
Podocytes are cells in the Bowman's capsule in the kidneys that wrap around capillaries of the glomerulus. The Bowman's capsule filters the blood, retaining large molecules such as proteins while smaller molecules such as water, salts, and sugars are filtered as the first step in the formation of urine.

12. **(a)** Alveoli
Explanation:
Lung alveoli are the ends of the respiratory tree, branching from either alveolar sacs or alveolar ducts, which like alveoli are both sites of gas exchange with the blood as well. Alveoli are particular to mammalian lungs.



13.

(b) Both A and R are true but R is not the correct explanation of A.
Explanation:
Yeast is single celled unicellular fungus. At the time of reproduction, it becomes a reproductive unit. Such fungi are called holocarpic. Yeast does not have a mycelium. Its cells may adhere to form short temporary chains. Such a short temporary chain is known as pseudomycelium.


Chain of vegetative cells produced by budding in Yeasts

14.

(c) A is true but R is false.
Explanation:
Constitutive enzymes are those, which are always present because of their requirement for a vital process, e.g. enzymes of glycolysis. These enzymes are present in the cytoplasm.

15. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
Both A and R are true and R is the correct explanation of A.

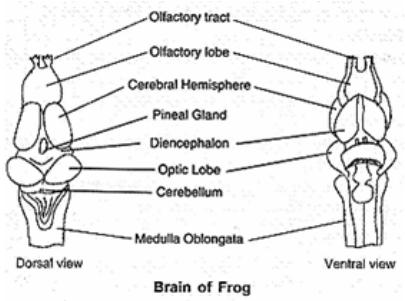
16.

(b) Both A and R are true but R is not the correct explanation of A.
Explanation:
Both A and R are true but R is not the correct explanation of A.

Section B

17. **Open Vascular bundles:** These vascular bundles contain a strip of cambium in between phloem and xylem. Open vascular bundles are collateral and bicollateral.

Closed Vascular bundles: Intrafascicular cambium is absent. Closed vascular bundles can be collateral or concentric.

18. **Four Activities Regulated by Estrogen Hormone are:**
    i. The **stimulation** and **growth** of **secondary sex organs.**
    ii. The **development** of growing **follicles.**
    iii. The appearance of **female secondary sexual characteristics** like voice pitch is high, mammary glands development and other features, etc.
    iv. To **regulate** female **sexual behaviour.**
19. 

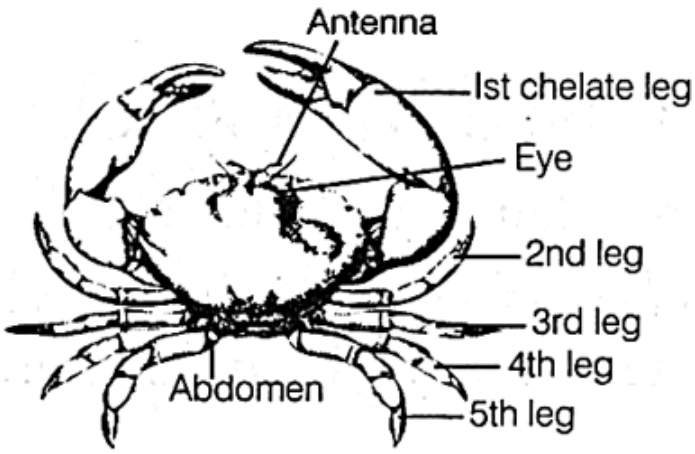
Brain of Frog
20. A taxon is a particular level of hierarchy in the system of classification of living beings. The following figure gives taxa at different hierarchical levels:
    Kingdom
    Phylum
    Class
    Order
    Family
    Genus
    Species
21. In the absence of light, chlorophyll production decreases in leaves, leading to a reduction in the green pigment content. This causes the leaf to appear yellow or pale green. Carotenoids are more stable than chlorophyll.

    OR

    Four basic requirements are as follows:
    i. A unit membrane
    ii. A proton pump
    iii. A proton gradient
    iv. ATP synthase enzyme

Section C

22. Limulus (the king crab or horseshoe crab) continues to remain unchanged for the past 190 million years. It is, therefore, also called living fossil. Excretion occurs through four pairs of coxal glands. Respiration occurs through book gills.



23. i. **Red algae:** The pigment phycoerythrin in Rhodophyceae gives it the unique red colour and hence the name red algae.
    Brown algae: The pigment fucoxanthin in phaeophyceae gives it the unique brown colour and hence the name brown algae.
    ii. In liverworts there is no protonema stage, while in moss the life cycle begins with the protonema stage.
    iii. Majority of pteridophytes are homosporous, while some of them are heterosporous. Selaginella and salvinia are heterosporous. Basically the presence of heterospory in certain pteridophytes is a precursor of seed habits of higher plants, like gymnosperms and angiosperms.

24. **Lipids:** They are macro biomolecules. They are organic compounds; insoluble in water but soluble in organic solvents such as chloroform, benzene, and petroleum, ether, etc. They have **long chains of aliphatic hydrocarbons** or a benzene ring. Oil, butter, ghee, waxes, natural rubber, and cholesterol are either lipids or rich in lipids. **Fats** form an important structural component of cell membranes, pigments such as **carotene** and **lycopene,** menthol, hormones, and vitamins A, E and K. Chemically, fats are compounds of C, H, and O.

25.

Protoplasmic substances	Apoplasmic substances
It is the living matter of cells. It results in the intrinsic growth of the body.	It includes non-living matter and connective tissues. It results in the cells of the body of higher animals.
They are formed as a result of metabolism.	They are not formed as a result of metabolism.
These substances occur within the cells.	These substances are formed outside the cells.
These are formed by the cells. Protoplasmic substances help in the growth and make the components of protoplasm.	These are secreted by the cells. These form the matrix and fibres of the connective tissue.

26.

Open circulatory system	Closed circulatory system
(i) Blood pumped by the heart passes through large vessels into open spaces or body cavities called sinuses.	(i) Blood is pumped by the heart is always circulated through a closed network of blood vessels.
(ii) The respiratory pigment is absent in most of the cases.	(ii) The respiratory pigment is present in all cases.
(iii) Present in arthropods and mollusks.	(iii) Present in annelids, some mollusks, and all vertebrates.

OR

Right ventricle	Left ventricle
It is smaller than the left ventricle.	It is comparatively larger than the right ventricle.
Moderator hand pre-sent in it.	Moderator band is lacking in it.
Columnar carneae thicker but less intricate.	Columnar carneae is narrower but more intricate.
Receives and pushes deoxygenated blood.	Receives and pumps oxygenated blood.
Crescent-shaped.	Biconvex in shape.
The wall of the right ventricle is thinner than the left ventricle.	The wall of its is thicker than the right ventricle.

27. Muscles exhibit various special properties, some of them are as follows:
    i. **Contractibility:** The cells of muscle can be shortened considerably and return to the original relaxed state.
    ii. **Excitability:** It is due to the energy stored in the electrical potential difference across the plasma membrane.
    iii. Muscles also possess properties of extensibility and elasticity (because of proteins actin and myosin).
28. **Protective Coverings of the Brain:** It is covered by three membranes or meninges (cranial meninges)
    i. The outermost membrane, the **dura mater** is the tough fibrous membrane adhering close to the inner side of the skull.
    ii. The middle membrane is a very thin layer called the **arachnoid membrane** (arachnoid mater).
    iii. The innermost membrane, the **pia mater** is thin, very delicate, which is in contact with the brain tissue.

Section D

29. i. **The sexual cycle of fungi involves the following steps :**
        a. The fusion of protoplasms between two motile or non-motile gametes is called plasmogamy.
        b. The fusion of two nuclei is called karyogamy.
        c. Meiosis in zygote results in haploid spores.

    ii. Rhizopus is a fungus that reproduces by spore formation.
    No, Rhizopus - wheat rush is not a correct match.

    iii.
    - Mutualistic associations between fungi and plant roots are called mycorrhizae.
    - Fungi that form mycorrhizal (mycorrhizal fungi) can deliver inorganic nutrients such as phosphate.
    - In exchange, the plants supply the fungi with organic nutrients.

    OR
    Fungi store food in the form of glycogen, along with oil bodies.

Plants, protists, mammals, and fungi all have vacuoles in their cells. Food vacuoles are sacs enclosed by a membrane and have a digestive function.

30. i.
    - Rhizome - Ginger, turmeric.Banana
    - Bulb - Tulips, Lilies, Daffodils, Onion, Garlic
    - Corm - Colocasia, Yam, Saffron
    - Tuber - Potato, Artichokes

    ii. It has nodes and internodes. Such nodes and internodes are not found in the roots.

    iii. Modified stem in the potato is underground and it becomes swollen because food gets accumulated to form tubers.

    OR

    No. Many different parts of plants, like the stem, leaves and fruits, get modified to act as underground structures that can perform functions other than those of roots.

Section E

31. It is possible to make calculations of the net gain of ATP for every glucose molecule oxidized, but in reality, this can remain only a theoretical exercise.

    Following assumptions are made while calculating the respiratory balance sheet:

    - Respiration involves a sequential and orderly pathway.
    - NADH which is synthesized during glycolysis is transferred to mitochondria where it undergoes oxidative phosphorylation.
    - None of the other intermediates in the pathway are utilized to synthesize any other compound.
    - Only glucose is undergoing oxidation. No other substrate is being utilized at any intermediate stage.

    But these assumptions are not valid for a living system. All pathways work simultaneously and they cannot always work one after another, i.e. in sequence. ATP is utilized as and when needed. Glucose is not the only substrate. In spite of the practical limitations, this calculation

    is quite useful.

Fermentation	**Aerobic respiration**
(i) Partial breakdown of glucose happens during	(i) Complete breakdown of glucose takes a process into ethanol. place into carbon dioxide.
(ii) There is a net gain of only two ATP molecules.	(ii) There can be a net gain of 36 molecules of ATP.
(iii) Oxidation of NADH to NAD^+ is slow.	(iii) Oxidation of NADH to NAD^+ is very fast.

OR

Electron Transport System (ETS): The metabolic pathway by which the electrons passes from one carrier to another is known as the **electron transport system.** It is operative in the inner mitochondrial membrane of mitochondria. The electrons from NADH produced in the mitochondrial matrix during the citric acid cycle are oxidised by an **NADH dehydrogenase** (Complex I). Electrons are then transferred to Ubiquinone that receives reducing equivalents via FADH, {generated during oxidation of succinate) by the activity of **Succinic dehydrogenase** (Complex II) in TCA. Reduced ubiquinone is oxidised with the transfer of electrons to cytochrome V via Cytochrome V complex (complex III). Cytochrome V acts carrier for transfer of electrons between complex III and complex IV. Complex IV refers to cytochrome c oxidase complex having cytochromes a and α_3 and two copper centres.

32. i. Facilitates proper segregation of chromosomes.

    ii. It provides structural rigidity to the plant cells. Plants cells need to be rigid because they cannot run for safety in case of any natural stress; unlike animals.

    iii. Smooth ER facilitates the synthesis of lipids, metabolism of carbohydrates, regulation of calcium concentration and drug detoxification.

    iv. Golgi apparatus is involved in the packaging of various substances that are manufactured in the endoplasmic reticulum.

    v. They form the basal bodies of cilia and flagella and thus play an important role in the motility of certain cells. They also play an important role in cell division by forming asters. The aster as spindle pole during cell division.

OR

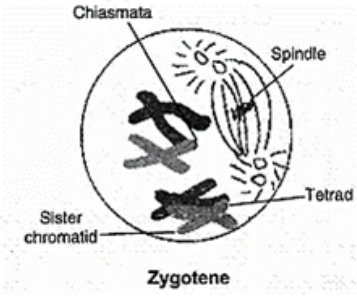
Chemically the plasma membrane consists of proteins (20-70%), lipids (20-79%), carbohydrates (1-5%) and water (20%). Nucleic acids (DNA and RNA) are absent in the plasma membrane. The lipids present in the plasma membrane are phospholipids, glycolipids (sugar lipids) and sterols.

Each lipid molecule consists of a three carbon glycerol poles (head) which is hydrophilic (water-loving) in nature and two long tails of fatty acids which are hydrophobic (water-fearing) in nature.

The hydrophilic glycerol poles of lipid are located towards the outside of the lipid bilayer whereas, the hydrophobic fatty acid tails are repelled by water and face towards the inner side of the membrane.

The hydrophilic and hydrophobic forces in lipid molecules cause the membrane to become a bilayer.

33. i. During zygotene of prophase I of meiosis homologous chromosomes pair together. This pairing is called synapsis.



ii. **Bivalent:** The complex formed by homologous chromosomes during zygotene is called a bivalent. They are also known as tetrad

iii. **Chiasmata:** During diplotene, the paired chromosomes make a X-shaped structure. This is called chiasmata. It is a site where two non-sister chromatids of homologous chromosomes have crossed over.

OR

The statement of the biologist is **correct.** Because the life history of an organism can be summed up **as gametic fusion, equational division, and reductional division.** By the fusion of male and female gametes, the gametic zygote is formed and from the zygote develops the adult. The zygote is formed during sexual reproduction. Half of the chromosome comes from the mother and the other half chromosomes come from the father to bring the character from both the parents. The male and female gametes are formed as a result of meiosis. The body cell divides by **mitosis.** In prophase of meiosis I, the exchange of segments between the two adjacent non-sister chromatids of the homologous pair at different sites takes place which results in the genetic recombinations.