

Introduction to Biotechnology

Exercises

Q. 1. Each of the following statements is wrong. Rewrite them correctly by changing either one or two words.

- A. Simple squamous epithelium is present in respiratory tract.**
- B. Glandular epithelium is present in kidneys.**
- C. Chlorenchyma helps the plant to float in water.**
- D. Striated muscles are also called involuntary muscles.**
- E. Chloroplast is present in permanent tissue.**

Answer :

- A. Ciliated Epithelium is present in respiratory tract.**
- B. Cuboidal epithelium is present in tubules of kidneys.**
- C. Parenchyma (sub type : Aerenchyma) helps the plant to float in water.**
- D. Non-Striated muscles are also called involuntary muscles.**
- E. Chloroplast is present in Parenchyma**

Q. 2. Identify the odd word and explain why it is odd.

- A. Xylem, phloem, permanent tissue, meristematic tissue.**
- B. Epithelium, Muscle fibre, nerve fibre, epidermis.**
- C. Cartilage, bone, tendon, cardiac muscle.**

Answer : A. Meristematic Tissue

Explanation: Xylem & phloem are types of complex permanent tissues whereas meristematic tissues are different group of tissues which helps in growth of specific parts of plants.

B. Epidermis

Explanation: Epidermis is odd one out because it's a plant tissue whereas others are animal tissues. Epidermis is a group of cells which form the outer layer of the plants.

C. Cardiac Muscle

Explanation: Heart is made up of Cardiac muscles whereas Cartilage, bone & tendon are types of connective tissues.

Q. 3. Write the names of the following tissues.

- A. Tissue lining inner surface of mouth.**
- B. Tissue joining muscles and bones.**
- C. Tissue responsible for increasing height of plants.**
- D. Tissue responsible for increasing growth of stem.**

Answer : A. Squamous epithelium

B. Tendons

C. Meristematic tissue (Apical Meristem)

D. Meristematic tissue (Lateral Meristem)

Q. 4. Write the differences.

Simple tissue and complex tissues in plants.

Answer :

SIMPLE TISSUE	COMPLEX TISSUE
1. Simple tissues are made up of one type of cells.	1. Complex tissues are made up of more than one type of cells.
2. In plants, meristematic tissues are types of simple tissue.	2. Xylem and Phloem are complex tissues in plants.
3. Meristematic tissues are present in specific parts of the plants and helps in growth of different parts of plants.	3. They are present all over the plant and consists of dead & living cells. Their main function is to carry water, minerals & amino acids to different parts of plants.

Q. 5 A. Write short notes.

Meristematic tissue:

Answer : As meristematic tissue is present in specific parts of a plant, growth occurs in those parts only. Cells of meristematic tissue contain thick cytoplasm, a conspicuous nucleus and a thin cell wall and are compactly packed together. Vacuoles are usually

absent in these cells. These cells are highly active. To bring about plant growth is the main function of meristematic tissue. According to the location, meristematic tissue is of three types:

a) Apical Meristem: It is present at the tip of roots & stem and increases the length of roots and stem.

b) Intercalary meristem: It is present at the petiole of leaves & branches and helps in growth of branches and formation of leaves

c) Lateral meristem: It is present at the lateral sides of stems & roots and help in growth of them.

Q. 5 B. Write short notes.

Xylem :

Answer :

Xylem consists of thick walled dead cells. Mainly it is formed by tracheids, vessels & xylem fibres which are dead cells and Xylem parenchyma which is living cell. Xylem are interconnected tubes which conduct water & minerals only in upward direction that is from soil to the plant.

Q. 5 C. Write short notes.

Striated muscles:

Answer :

Striated Muscles are the types of muscular tissues which consist of Muscle cells which are long, cylindrical, multinucleate and have no branches. There are alternate dark and light bands on these muscles as they are attached to bones, they are also called skeletal muscles. They move as per our will, hence they are called voluntary muscles. These muscles bring about movements of arms and legs, running, speaking, etc.

Q. 5 D. Write short notes.

Agro-complementary business:

Answer : It refers to a business which is done complementary with agriculture like animal husbandry, poultry and sericulture.

Q. 5 E. Write short notes.

Genetic engineering:

Answer : It refers to the modification done to the genes in order to get different types of fruits, crops etc.

In agriculture, genetically modified crops play a very crucial role. Genetically Modified Crops are being produced by introducing changes in DNA of natural crops. Normally, such varieties are not found in nature. Thus, new varieties are produced artificially. Different useful characters are introduced in such varieties. Examples of genetically modified crops are:

Maize : MON 810, MON 863. Potato : Amflora Rice : Golden Rice Soybean : Vistive Gold Tomato : Vaishali Cotton : BT cotton

Q. 5 F. Write short notes.

Sericulture:

Answer : Sericulture refers to the rearing of silk worms in order to get silk.

- i. Bombyx mori is the most commonly used variety for this purpose
- ii. Thousands of eggs deposited by female moths are incubated artificially to shorten the incubation period.
- iii. Larvae hatching out of eggs are released on mulberry plants. Larvae are nourished by feeding on mulberry leaves. After feeding for 3 – 4 days, larvae move to branches of mulberry plant.
- iv. The silk thread is formed from the secretion of their salivary glands. Larvae spin this thread around themselves to form a cocoon.
- v. Ten days before the pupa turns into an adult, all the cocoons are transferred into boiling water. due to the boiling water, the pupa dies in the cocoon and silk fibres become loose.
- vi. These fibres are unwound, processed and reeled. Various kinds of fabric is woven from silk threads.

Q. 6. Explain the meaning of biotechnology and its impact on agricultural management with suitable examples.

Answer : Biotechnology refers to a technique in which artificial genetic modification and hybridization is done to living organisms so that plants and animals get improved characteristics in addition to their natural ones. Biotechnology had a great impact on agricultural management which are as follows:

- i. It includes tissue culture and genetic engineering.

- ii. It is used to grow cash crops which are resistant to pests.
- iii. It increases the ability of plants to withstand environmental stress.
- iv. Genetically modified crops are grown with the help of biotechnology which have greater nutritive value and there is decrease in loss of crops.

Q. 7. Which two main techniques are used in biotechnology? Why?

Answer : Tissue culture and Genetic engineering is used in biotechnology because:

- i. With this technique endangered species of plants can be grown.
- ii. Genetically modified crops are grown which are pest resistant, have more nutritive value and there is decrease in loss of crops.
- iii. Plants grown by these techniques are disease free and virus free.

Q. 8. Discuss 'Agritourism' in the class and write a project on an agrotourism centre nearby. Present It in the class in groups.

Answer : We recently visited Saiban Agro tourism centre in Ahmednagar , Maharashtra. Different species of plants are grown on a large scale with the help of tissue culture. There are separate laboratories where tissue culture technique is being practiced. The main attraction includes:

- i. Mango, chikoo (sapota), guava, coconut, custard apple and some other regional fruit trees.
- ii. Shade giving local or exotic attractive plants.
- iii. Ornamental and flowering plants.
- iv. Butterfly garden.
- v. Medicinal plant garden.
- vi. Organic vegetables and fruits.

Q. 9. Define the term tissue and explain the concept of tissue culture.

Answer : A group of cells having same origin, same structure and same function is called tissue. Ex vivo growth of cells or tissues in an aseptic and nutrient-rich medium is called tissue culture. In this technique, tissues from the source plants are taken and are kept in artificial environment in which it can survive and grow. The cells grow and

multiply in this environment and after the hardening process the plants get ready to be planted.

Q. 10. 'Rearing of sheep is a livestock'. Justify this statement.

Answer : Livestock refers to the domesticated animals which are reared to produce different commodities. Rearing of sheep is definitely a livestock as sheep are raised by the people in order to get meat, milk & wool from them. It is a part of animal husbandry and is practiced so that rare species can survive. Sheep are reared in a particular climate and farmers have to build fences and take good care to produce good amount of meat , milk and wool.

Q. 11. Obtain information about the diversity of butterflies. Collect detailed information about what would have to be done to establish a butterfly garden in your school.

Answer : Steps to be taken to establish butterfly garden in school are:

- i. Select a place in school area where there is fertile land.
- ii. Grow different types of flowering plants that would attract butterflies.
- iii. Keep in mind that butterflies love Sunshine. So the area should get proper sunlight.
- iv. Water the plants regularly so that plants and flowers are fresh.
- v. Research about the butterflies in your area & what they love and accordingly plant more colourful flowering plants.
- vi. Make sure they get nectar from flowers.

Q. 12. Visit an apiculture centre and gather information about it.

Answer : Apiculture refers to artificial breeding of bees in man made hives. I recently visited an apiculture centre in Pune where bees are kept in artificial bee hives and honey and beeswax is being extracted from them. Moreover, these bees help in pollination so that crops can be grown. Location where bees are kept is called apiary. Trained beekeepers are always there to take care of bees and beehives. This is very profitable business as on one side bees are kept from which honey and beeswax are extracted and on other side these bees help in pollination. So a person can do both apiculture as well as farming side by side.