DEPARTMENT OF EDUCATION (S)
Government of Manipur

CLASS X
BIOLOGY
CHAPTER 15 - REPRODUCTION

SOLUTIONS

TEXTUAL QUESTIONS AND ANSWERS

Let us answer (Page 293)

Q.1 Why reproduction is essential in living organisms?

Ans: Reproduction is essential in living organisms to maintain the continuity of their own race (or species).

Q.2 Name the two methods of reproduction?

Ans: 1. Sexual reproduction 2. Asexual reproduction

Q.3 How can you differentiate budding from fragmentation?

Ans:

DIFFERENCES	
BUDDING	**FRAGMENTATION**
Asexual method of reproduction with **bud** which develops as an outgrowth (occur in unicellular or multicellular organism).	Organism with simple organization breaks up into smaller pieces.
It involves repeated cell division at a specific site.	It involves splitting of parent filament into daughter fragments.

Q.4 How does an organism be benefitted, if it reproduces through spores?

Ans: The organisms are benefitted by providing protection and a means of survival during unfavourable conditions.

Q.5 Why vegetative propagation is more suitable in some types of plants?

Ans: Vegetative reproduction is more suitable because

(i) It is used in artificial methods of reproduction such as layering, grafting, cutting, etc.

(ii) It is successfully performed in seedless plants like rose, grapes, sugarcane, banana, jasmine, etc.

(iii) It helps in the production of genetically identical offspring and plants raised by such method bears flowers and fruits earlier than those produced from seeds.

Q.6 What is tissue culture?

Ans: The technique of propagation of plants from cells, tissues or organs by growing on a sterilized medium under ***in vitro*** condition is known as **tissue culture.**

Q.7 How will you define a callus?

Ans: A **callus** may be defined as a mass of actively dividing undifferentiated cells derived from a culture.

Q.8 Name two plants which can reproduce by natural parthenogenesis.

Ans: *Thalictrum* and *Marsilea*

Q.9 Give the definition of cellular totipotency.

Ans: **Cellular totipotency** is defined as the ability of a somatic cell to divide and produce or regenerate the entire plant.

Let us answer (Page 293)

Q.1 How is the process of pollination different from fertilization?

Ans. The transfer of pollen grains from anther to the stigma of the same flower or different flowers is known as **pollination** whereas **fertilization** is the union of male and female gametes.

Q.2 Describe the parts of a dicot seed.

Ans: A dicot seed consists of an **embryonic plant**, **stored food** surrounded by protective **seed coat**. The embryo inside seed has a **plumule** or future shoot, a **radicle** or future root and **cotyledon** (2 in dicots). A **hilum** is the scar of the seed coat.

Or

- **Seed coat:** It is hard covering of the seed that provides protection against dehydration.
- **Hilum:** It is a scar of the seed coat.
- **Endosperm:** It is the nutritive tissue for the growth of embryo.
- **Embryo:** It is the embryonic plant containing a plumule, radicle and cotyledon.

Q.3 How does a seed germinate?

Ans: The growth and development of the dormant embryo within the seed is known as **germination.** Under favourable conditions, the seed coat splits following absorption of water through the micropyle and it develops into seedling with the emergence of radicle and the plumule.

Q.4 Name the different parts of a typical flower.

Ans: The different parts are:

- **Calyx** (sepals)**:** The outermost members that protect inner parts.
- **Corolla** (petals)**:** The brightly coloured parts of the flower that attract insect pollinator.
- **Androecium** (stamens-**anthers and filaments):** The male reproductive organ of the flower.
- **Gynoecium** (carpels or pistil-**stigma, style and ovary):** The female reproductive organ of the flower.

Let us answer (Page 296)

Q.1 Name an animal that reproduces by budding.

Ans: *Hydra* reproduces by budding.

Q.2 What is meant by binary fission?

Ans: Binary fission is a type of asexual reproduction in which a single-celled organism is divided into two daughter individuals. e.g. *Amoeba.*

TEXUAL EXERCISES

Q.1 What type of asexual reproduction takes place in yeast?

Ans: Budding

Q.2 Name the plant which reproduces by the process of Conjugation.

Ans: *Spirogyra* reproduces by the process of conjugation.

Q.3 What are the advantages of sexual reproduction over asexual reproduction?

Ans: The advantages are:

- Sexual reproduction **creates variation** for ensuring survival of species.
- It **produces new recombinations** by combining gametes from different individuals (necessary for evolution).

Q.4 Draw a labelled diagram of the longitudinal section of a typical flower.

Ans.

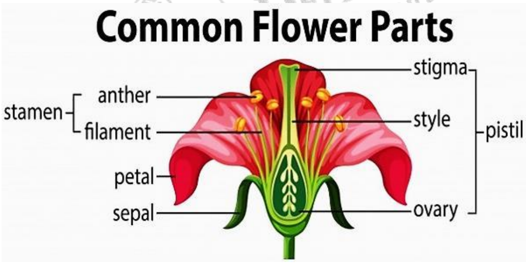

Fig: A longitudinal section of a typical flower

Q.5 Describe the two types of germination with labelled diagram.

Ans: The growth and development of embryo within the seed is known as germination, may be hypogeal or epigeal germination. In **hypogeal germination**, the cotyledons remain below the ground and the plumule emerges above the ground by the elongation of the epicotyl. e.g. Gram, Maize and Bean

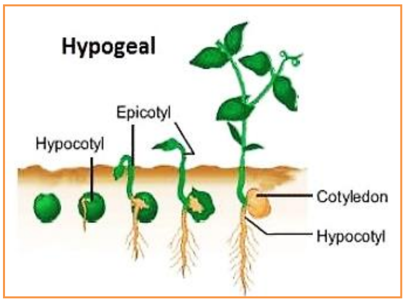

Fig: Hypogeal germination

In **epigeal germination**, the cotyledons and plumule emerges above the ground by the elongation of hypocotyl. e.g. Castor, Sunflower, and Tamarind

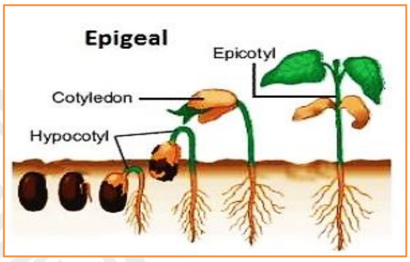

Fig: Epigeal germination

Q.6 How does binary fission differ from budding in animals?

Ans: In **binary fission**, the single-celled body divides into two identical daughter cells where the parent completely lost identity of the parent itself divides into two daughter cells whereas in **budding**, bud develops by repeated division at one site which get detached at maturity to form a new individual. The identity of the parent is not lost.

Q.7 How sexual reproduction takes place in *Paramecium*?

Ans: In *Paramecium*, the two partners meet with their oral grooves during **conjugation**. There is exchange of cytoplasmic and nuclear materials. After separation each individual divides into two by binary fission.

Q.8 Give one similarity between the sexual reproduction of Hydra and Tapeworm.

Ans: Both are **hermaphrodite** animals where male and female gonads mature at different times to perform sexual reproduction.

Q.9 In what way earthworm prevent itself from self-fertilization?

Ans: In earthworm sperms are exchanged between two individuals by copulation to prevent them from self-fertilization.

Q.10 What is metamorphosis? Give two examples which show metamorphosis.

Ans: The transformation from larva to adult during the development of an organism is known as **metamorphosis.**

Examples:

a. *The transformation of a tadpole into an adult frog.*

b. The transformation of silk worm into an adult moth.

Q.11 How will you define a viviparous animals? Give two examples.

Ans: The method of development of embryo within the maternal organism and derive nutrition by placenta is known as **viviparous.** They give birth to their young ones.

e.g. monkey, human beings, etc.

Q.12 What are the advantages of tissue culture in plants?

Ans: The advantages of tissue culture are:

- It is successfully used in propagation of economically important plants such as orchids, chrysanthemum, gladiolus, etc.
- It is a rapid method of propagation of plants (in large scale) in short duration.

Q.13 Why is parthenogenesis considered as asexual reproduction?

Ans: Parthenogenesis is considered as asexual reproduction because new individual is derived from a single parent **without fertilization.**

EXTRA QUESTIONS AND ANSWERS

Q1. What are the advantages of propagating plants without using seeds?

Ans: The advantages are:

- It is a rapid method to produce a large number of plants in short duration.
- It produces genetically identical offspring or clone.

Q2. What is the main function of a flower?

Ans: Sexual reproduction (or production of *male* and *female gametes*) is the main function of a flower.

Q3. How can the flowering plants be propagated without using seed?

Ans: Flowering plants can be propagated without using seed through vegetative propagation like layering, grafting, cutting and artificial culture.

Q4. Differentiate between sexual and asexual reproduction.

Ans: The **differences** between sexual and asexual reproduction is given in the table below:

ASEXUAL REPRODUCTION	SEXUAL REPRODUCTION
1. It involves single parent. 2. Gametes are not formed. 3. Fertilization is absent. 4. Offspring are genetically similar to their parents. 5. Variations are absent and do not play important role in evolution.	1. It involves male and female parents. 2. Gametes are formed. 3. Fertilization is present. 4. Offspring are genetically different from their parents. 5. It produces variation and play important role in evolution.

Q5. In what way self-pollination differs from cross pollination?

Ans: The transfer of pollen grains from the anther to the stigma of the **same flower** is known as **self-pollination** whereas **cross pollination** is the transfer of pollen grains from the anther to the stigma of two **different flowers** on different plants.

Q6. Describe the process of tissue culture in plants.

Ans: The parts of plant (roots, stem, leaf etc.) are cultured and maintained on a sterilized media containing necessary nutrients under *in vitro*. After some days a mass of undifferentiated and dividing cells known as **callus** are formed. By transferring the cells of the callus to other media containing hormones, the callus gets differentiated into plantlets.

Q7. What is artificial pollination ? State its practical use.

Ans: The transfer of pollen grains over the stigma of the selected plants by human beings is known as artificial pollination. It is useful in the production of **hybrids**.

Q8. What is cloning?

Ans: **Cloning** is a term used to describe the formation of a group of organisms of the same species by asexual method involving mitosis and vegetative or artificial propagation.

Or

Cloning is the process of generating a genetically identical copy of a cell or an organism. A clone possesses exact copies of the DNA of their parent. Clones exhibit remarkable similarity. E.g. Dolly (Sheep).