Reproduction in Plants and Animals

Reproduction is a biological process in which organisms produce offsprings. It is essential for the continuity of species in all living organisms. Broadly, the process of reproduction can be divided into following two types

1. Reproduction in Plants

The plants can reproduce by both ways, i.e. asexually and sexually.

Asexual Reproduction in Plants

The asexual reproduction in plants takes place by the following methods.

(i) Vegetative Propagation

- New plants are produced from vegetative parts of the plants.
- Vegetative parts include roots, stems, leaves, etc.
- The vegetative units are called propagules.

Vegetative Propagule	Examples
Stems (by cutting)	Rose, sugarcane, cacti
Stems (by layering)	*Jasmine*
Leaves	*Bryophyllum*
Buds (eye)	Potato, ginger
Roots	Sweet potato, *Dahlia*

(ii) Budding

- New individual is formed from a small projection on parent body and forms bud.
- The bud grows and gets detached from the parent body.
- The detached part further grows, matures and forms new daughter cells, e.g. yeast.

(iii) Fragmentation

- The body of the parent breaks into small pieces called fragments. Each fragment grows up to become a new plant.
- Some algae (e.g. *Spirogyra*)

(iv) Spore Formation

The spores are asexual reproductive bodies where, under favourable conditions, spores germinate and develop a new individual, e.g. mosses, ferns, bread moulds, etc.

Sexual Reproduction in Plants

- **Flowers** are the reproductive part of a plant.
- **Stamens** are the male reproductive organ. It is made up of-filament and anther.
- **Anther** contains pollen grains that contain male sex cells.

- **Pistil** is the female reproductive part of flower. It is made up of three parts-stigma (top), style (middle) and ovary (lower).
- **Ovary** makes ovules that contain female sex cells (egg cells).

> ***Types of Flower***
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> *On the basis of the type of reproductive organs present in a flower, the flowers are of following types*
>
> - *Unisexual flower The flower which contains only one reproductive organ (i.e either male or female) is called unisexual flower. This is also called as incomplete flower, e.g. papaya, watermelon, corn, cucumber, etc.*
> - *Bisexual flower The flower that contains both reproductive parts (i.e. male and female) in a single flower is called a bisexual flower. This is also termed as hermaphrodite or complete flower, e.g. rose, mustard, Hibiscus, etc.*

Various events occurring in plants during sexual reproduction are described below

Pollination

- The transfer of pollen grains from the anther of a stamen to the stigma of a pistil is called pollination.
- The process of pollination is carried out by external agencies like wind, water, insects, etc.
- Pollination takes place in two different ways
  (i) **Self-Pollination** The pollen grain from the anther of one flower reaches to the stigma of the same flower. It generally occurs in a bisexual flower.
  (ii) **Cross-Pollination** The pollen grains from the anther of a flower or of a plant are transferred to the stigma of a flower of the same plant or that of a different plant of the same kind. This transfer to another plant is mediated by insects, wind, water, animals, birds, etc.

Fertilisation

- The process in which the male gamete fuses with female gamete to form a new cell (called zygote) is called fertilisation.
- The zygote inside the ovary derives its food from the ovule.
- After the fertilisation, the ovary grows into the fruit and the ovule develops into the seeds.
- The seed contains an embryo enclosed by protective seed coat.

2. Sexual Reproduction In Animals

In animals, males and females have different reproductive parts or organs.

(i) **The male reproductive** These organs include a pair of testis, two sperm ducts and a penis (external genital organ).

(ii) **The female reproductive** These organs are a pair of ovaries, oviducts (Fallopian tube) and the uterus. Ovaries produce the female gamete called ova (or egg).

Fertilisation

The male and female gametes fuses to form a new cell called zygote.

- After fertilisation, the zygote begins to develop into an embryo. The embryo gets embedded in the walls of the uterus for further development.
- Various body parts begin to develop due to repeated divisions of cells.
- The stage of embryo in which all the body parts can be identified is called a **foetus**.
- When foetus develop completely, mother gives birth to the baby.

Types of Fertilisation

Internal Fertilisation

- The process of fusion of gametes taking place inside the female body is called internal fertilisation.
- It occurs in humans, cows, dogs, etc. Internal fertilisation takes place in hens also but hens do not give birth to babies like human beings and cows.

External Fertilisation

- The process of fusion of male and female gametes takes place outside the body of a female is called external fertilisation.
- It is commonly found in aquatic animals like frog, fish, starfish, etc.

Viviparous and Oviparous Animals

- The animals in which females give birth to young ones are called **viviparous animals**, e.g. humans, cows, cats, etc.
- The animals in which females lay eggs are called **oviparous animals**, e.g. frogs, hens, etc.
- The new individuals which are born or hatched from the eggs continue to grow till they become adults.
- In some animals, the young ones may look very different from the adults, e.g. the life cycle of the silkworm
  Egg → Larva or caterpillar → Pupa → Adult
- The process of transformation of larva to an adult through a series of drastic changes is referred to as **metamorphosis** such as in frog, silkworm, butterfly, etc.

Adolescence and Puberty

The World Health Organisation (WHO) defines adolescence as the period of life between 11 and 19 years of age. Since, adolescence period covers the **teens period** (i.e.13-19 years of age), adolescents are also called **teenagers.**

The human body undergoes several changes during adolescence. These changes mark the onset of **puberty.** It is the age at which reproductive organs become functionally active (i.e. boys and girls become capable of reproduction). Puberty ends when an adolescent reaches reproductive maturity.

The following changes occur in boys and girls.

- There is tremendous spur in increase in height of male and female individuals at puberty.
- In **boys**, the shoulders become broader and the chest becomes wider. The muscles of the body grow more prominently. In **girls**, the pelvic region (region below the waist) widens, hips broaden, breasts develop and increase in size.
- Larynx is bigger in boys and can be seen as a protruding part of the throat called **Adam's apple.** In adolescent boys, sometimes, the muscles of the growing voice box go out of control and the voice becomes hoarse. This state may remain for a few days or weeks after which the voice becomes normal.
- The sex organ in boys and girls develop to become sexually mature.
- There are development of secondary sexual characters, i.e. development of breast in girls and beard, moustaches in boys. There is on set of manstruation cycle in girls.
- The male hormone (testosterone) and female hormones (oestrogen) play important role in the puberty and adolescence. The maturation of sex organs and appearance of secondary sexual characters in both (boys and girls) occurs under the influence of these sex hormones.

Practice Exercise

1. Reproduction is
   (a) biological process of producing young ones
   (b) non-biological process of producing young ones
   (c) biological process of producing mature ones
   (d) None of the above

2. Asexual reproduction is common in
   (a) single celled organisms
   (b) plants with relatively simple organisation
   (c) animals with relatively simple organisation
   (d) All of the above

3. Which type of reproduction amongst the following involves single parent?
   (a) Sexual reproduction
   (b) Asexual reproduction
   (c) Both (a) and (b)
   (d) None of the above

4. The production of an exact copy of an animal by asexual reproduction is known as
   (a) budding (b) mating
   (c) cloning (d) hatching

5. Onion is propagated throught its
   (a) tubers (b) bulbs
   (c) seeds (d) rhizomes

6. The eyes of potato are
   (a) flower buds (b) shoot buds
   (c) vegetative structure (d) None of these

7. The layering the most common method of reproduction in which of the following plant?
   (a) Jasmine (b) Rose
   (c) Guava (d) None of these

8. Examples of vegetative propagation are
   (a) rhizome
   (b) tuber
   (c) offset
   (d) All of the above

9. The reproduction in *Bryophyllum* takes place
   (a) buds on leaves (b) buds on stem
   (c) roots (d) flower

10. The vegetative reproduction in *Jasmine* takes place by
    (a) eyes (b) layering
    (c) leaves (d) grafting

11. Which amongst the following is the reproductive part of the plant?
    (a) leaf (b) flower (c) stem (d) root

12. Pollen grains are found in
    (a) carpel (b) stigma
    (c) anther (d) None of these

13. Male gametes are also called
    (a) antherozoid (b) sperm
    (c) egg (d) Both (a) and (b)

14. Female gametes are also called
    (a) egg (b) ovum
    (c) Both (a) and (b) (d) antherozoid

15. The reproductive part of a plant is the
    (a) leaf (b) stem
    (c) root (d) flower

16. Pollen grains are
    (a) male reproductive structure
    (b) spore mother cell
    (c) male sperm cell
    (d) female structure

17. In human beings, the correct sequence of events during reproduction is
    (a) gamete formation, fertilisation, zygote formation embryo
    (b) embryo, zygote formation, fertilisation, gamete formation
    (c) fertilisation, gamete formation, embryo, zygote formation
    (d) gamete formation, fertilisation, embryo, zygote formation

18. In the list of animals given below, hen is the odd one out.
Human being, cow, dog, hen. The reason for this is
(a) it undergoes internal fertilisation
(b) it is oviparous
(c) it is viviparous
(d) it undergoes external fertilisation

19. Which of the following is not a part of the human male reproductive system?
(a) Testes (b) Oviducts
(c) Seminal vesicles (c) Epididymis

20. The production of an exact copy of an animal by asexual reproduction is known as
(a) budding (b) mating
(c) cloning (d) hatching

21. After fertilisation, the resulting cell which gives rise to a new individual is the
(a) embryo (b) ovum
(c) foetus (d) zygote

22. The egg laying mammals are
(a) *Platypus* (b) *Echidna*
(c) Both (a) and (b) (d) None of these

23. The belief that the mother is completely responsible for the sex of the child is wrong because the child
(a) gets sex chromosome only from the mother
(b) develops in the body of the mother
(c) gets one sex chromosome from the mother and the other from the father
(d) gets sex chromosome only from the father

24. The faulty functioning of an endocrine gland can make a person very short or very tall. This gland is
(a) thyroid (b) pituitary
(c) adrenal (d) pancreas

25. The beginning of menstruation at puberty is called
(a) ovulation (b) menstruation
(c) menarche (d) menopause

26. The male hormone is
(a) oestrogen (b) progesterone
(c) testosterone (d) All of these

27. The most conspicuous visible change that occurs in boys during puberty is
(a) development in voice box
(b) increase in height
(c) production of sperms
(d) increased sweating

28. Given below are events that lead to pregnancy and development of embryo.
(i) Fertilisation of egg
(ii) Maturation of egg
(iii) Release of egg
(iv) Embedding of embryo in uterus
Which of the following options gives the correct order of sequence in which they occur?
(a) (i), (ii), (iii), (iv) (b) (ii), (i), (iii), (iv)
(c) (i), (iv), (ii), (iii) (d) (ii), (iii), (i), (iv)

29. The dramatic changes in body features associated with puberty are mainly because of the secretions of
(i) Thyroxine (ii) Oestrogen
(iii) Adrenaline (iv) Testosterone
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i) and (iii) (d) (ii) and (iv)

30. Pimples and acne are formed due to the increased activity of
(i) Adrenal glands (ii) Sebaceous glands
(iii) Thyroid gland (iv) Sweat glands
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i) and (iii) (d) (ii) and (iv)

Answers

1	(a)	2	(d)	3	(b)	4	(c)	5	(b)	6	(c)	7	(a)	8	(d)	9	(a)	10	(b)
11	(b)	12	(c)	13	(d)	14	(c)	15	(d)	16	(a)	17	(a)	18	(b)	19	(b)	20	(c)
21	(a)	22	(c)	23	(c)	24	(b)	25	(c)	26	(c)	27	(a)	28	(d)	29	(d)	30	(d)