How do Organisms Reproduce?

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CLASS: X **BIOLOGY**

1. What is the basic event in reproduction?

The basic event in reproduction is the creation of a DNA copy.

Cells use biochemical reactions to build copies of their DNA.

2. Why do organisms look similar?

Organisms look similar because their body designs are similar.

If body designs are to be similar, the blueprints (DNA) for these designs should be similar.

3. Why is DNA copying essential?

- DNA (Deoxyribonucleic acid) copying is an essential part of reproduction because;
- It passes genetic information from parents to offspring.
- It determines the body design of an individual.

4. What is the basis for evolution?

The inbuilt tendency for **variation** during reproduction is the basis for evolution.

5. What will happen to a newborn cell which has inherited a DNA copy with drastic variations?

- DNA copy cannot work with the cellular apparatus it inherits.
- Such a newborn cell will simply die.

6. What is the importance of DNA copying in reproduction?

DNA (Deoxyribonucleic acid) is the genetic material found in the chromosomes, which are present in the nucleus of a cell.

The DNA is the information site for making proteins and each specific type of protein leads to a specific type of body design.

DNA molecule determines the body design of an individual.

DNA gets transferred from parents to offsprings and makes them look similar.

7. Why does variation occur during DNA copying process?

- No bio-chemical reaction is absolutely reliable.
- Therefore, the process of copying the DNA has some variations each time.
- As a result, the DNA copies generated will be similar but may not be identical to the original.

8. Why is variation beneficial to the species but not necessarily for the individual?

Variations are beneficial to the species than individual because sometimes for a species, the environmental conditions change so drastically that their survival becomes difficult.

For example, if the temperature of water increases suddenly, then most of the bacteria living in that water would die.

Only a few variants that are resistant to heat would be able to survive.

If these variants were not there, then the entire species of bacteria would have been destroyed.

Thus, variation helps in the survival of the species. However, all variations are not necessarily beneficial for the individual organisms.

9. How are the modes for reproduction different in unicellular and multicellular organisms?

No	Unicellular Organisms	Multicellular Organisms
1	Specific reproductive organs are not there	Specific reproductive organs present.
2	The mode of reproduction involves simple methods such as budding, fission etc	The mode of reproduction involves complex methods such as vegetative propagation, spore formation, sexual reproduction etc.
3	Mostly a single individual is involved.	Mostly two individuals are involved.

10. Why more complex organisms cannot give rise to new individuals through regeneration?

Simple organisms such as *Hydra* and *Planaria* are capable of producing new individuals through the process of regeneration.

The process of regeneration involves the formation of new organisms from their body parts.

Simple organisms can utilize this method of reproduction as their entire body is made of similar kind of cells in which any part of their body can be formed by growth and development.

Complex organisms have organ-system level of organization. All the organ systems of their body work together as an interconnected unit.

They can regenerate their lost body parts such as skin, muscles, blood, etc. But, they cannot give rise to new individuals through regeneration.

11. How will an organism be benefited if it reproduces through spores?

There are many advantages, if an organism reproduces through spores.

Advantages of spore formation:

- Large numbers of spores are produced in one sporangium.
- Spores are distributed easily by air to far-off places to avoid competition at one place.
- Spores are covered by thick walls to prevent dehydration under unfavourable conditions.

12. Differentiate between binary fission and multiple fission.

No	Binary fission	Multiple fission
1	Division of nucleus occurs only once	Nucleus divides several times to produce many daughter nuclei.
2	Division of nucleus is immediately followed by division of cytoplasm by constriction of plasma membrane.	Each daughter nucleus is surrounded by some cytoplasm. These daughter nuclei develop plasma membrane surrounding them and form new individuals.
3	Two daughter cells are formed.	Many daughter cells are formed.

13. Describe the advantages of vegetative reproduction.

Vegetative propagation has the following advantages.

1. **Faster mode of reproduction:**

   Plants raised by vegetative propagation can **bear flowers and fruits earlier** than those produced from seeds.

2. **Propagation of plants which lost the ability to produce seeds:**

   This method helps the propagation of plants such as banana, rose and jasmine that have lost the ability to produce seeds.

3. **Propagation of Genetically identical plants:**

   All the plants produced by vegetative propagation are **morphologically and genetically similar** to the parents to have all their characteristics.

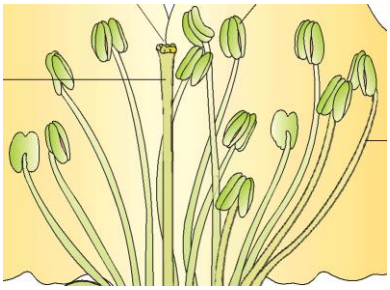
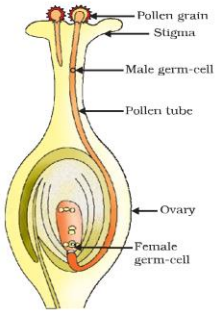
14. Differentiate between unisexual Flower and bisexual Flower.

No	Unisexual Flower	Bisexual Flower
1	The flower may be unisexual when it contains either stamens or carpels.	The flower may be bisexual when it contains both stamens and carpels.
2	papaya, watermelon	Hibiscus, mustard

15. How is the process of pollination different from fertilization?

Pollination	Fertilization
It is the transfer of pollen grains from anther to stigma. It occurs with the help of certain pollinators such as air, water, birds, or some insects.	It is the fusion of male and female gamete. It occurs inside the ovule and leads to the formation of zygote.

16. Differentiate between stamen and pistil.

No	Stamen	Pistil
1	Stamen is the male reproductive part	Carpel is the female reproductive part.
2	It is made of two parts	It is made of three parts.
3	The stalk of the stamen is **filament**. The swollen tip is **anther.**	The swollen bottom part is the **ovary** Middle elongated part is the **style** The sticky terminal part is the **stigma.**
4	The anther contains pollen grains that are yellowish in colour.	The ovary contains ovules and each ovule has an egg cell.
		

17. Differentiate between self-pollination and cross pollination.

No	Self-Pollination	Cross Pollination
1	Self pollination is the transfer of pollen grains from anther to stigma **within a flower or between the flowers of the same plant.**	Cross pollination is the transfer of pollen grains from anther to stigma **between the flowers of two different plants.**
2	It does not require any agent.	It is achieved by agents like wind, water, birds, and insects.or animals.
3	Recombination or formation of new characters does not occur.	Recombination or formation of new characters occurs.

18. What are the advantages of sexual reproduction over asexual reproduction?

1. It promotes **genetic variability** in offsprings.
2. The individuals formed from sexual reproduction are **better adapted** to environmental changes.
3. Recombinations result in the formation of a new species.
4. It causes **variations** which leads to **evolution.**

19. What are the changes seen in girls at the time of puberty?

Secondary sexual characteristics in girls:

- Increase in breast size
- Darkening of skin of the nipples present at the tips of the breasts.
- Appearance of hair in the genital area.
- Appearance of hair in other areas of skin like underarms, face, hands, and legs.
- Increase in the size of uterus and ovary.
- Beginning of menstrual cycle.
- More secretion of oil from the skin, which results in the appearance of pimples.

20. Why do many sexual changes occur during puberty?

- If animals are to participate in the process of mating, their state of sexual maturity must be identifiable by other individuals.
- So, many sexual changes occur during puberty.

21. Why does the body show sexual maturation only at teenage?

- When the body of the individual organism is growing to its adult size, the resources of the body are mainly directed at achieving this body growth.
- While that is happening, the maturation of the reproductive tissue is not likely to be a major priority.
- The resources of the body are directed at achieving the sexual maturation only at teenage.

22. What are the functions performed by the testis in human beings?

The testes are the male reproductive organs that are located outside the abdominal cavity within a pouch called scrotum.

Functions of testes:

- The testes produce sperms
- They produce a hormone called testosterone.
- Testosterone brings about secondary sexual characters in boys.
- Testosterone regulates the formation of sperms

23. Give a short note on Sperms

The sperms are tiny bodies that consist of three regions such as **head, middle piece and a long tail.**

Head contains mainly genetic material.

Middle piece is the powerhouse of sperm.

Tail helps the sperms to move towards the female gamete.
It fertilizes the ovum to become a zygote.

24. List the organs of male reproductive system in human beings and write the functions of each organ.

Male reproductive system consists of a pair of testes, a pair of vas deferens, and a penis.

Testes: A pair of testes is located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.

They are the **primary sex organs** of male.

Function: The testes produce sperms

They produce a hormone called testosterone.

Testosterone brings about secondary sexual characters in boys.

Testosterone regulates the formation of sperms.

Vas deferens:

It is a long muscular tube starting from epididymis and joins with urethra coming from the urinary bladder.

Function: The sperms are delivered through the vas deferens.

Penis: It is a cylindrical, muscular erectile organ. **Urethra** is a straight tube which starts from urinary bladder, passes through the penis and opens at the tip of penis.

Functions: It helps in the transfer of sperm in the female reproductive tract.

The urethra forms a common passage for both the sperms and urine.

Prostate and seminal vesicles:

These are the accessory glands located along the path of vas deferens.

Functions: The secretions of prostrate and seminal vesicle provide **nutrition** to the sperms.

Their secretions provide **fluid medium** and lubrication to the sperms and make the **transport of sperms easier**.

25. What is the role of the seminal vesicles and the prostate gland?

The secretions from seminal vesicles and prostate glands provide a fluid medium for easy transport of sperms and also provide nutrition to the sperm in the form of fructose, calcium.

26. What is Menstruation? Why does it occur?

The periodic discharge of the uterus in the form of blood and mucous along with the degenerated ovum through vagina is called menstruation. When the egg is not fertilized, the thick and spongy uterine lining breaks down and comes out as menstruation.

27. List the organs of female reproductive system in human beings and write the functions of each organ.

Female reproductive system consists of a pair of ovaries, a pair of oviducts, a uterus and a vagina.

Ovary: A pair of almond-shaped structures present on either side of uterus. They are the **primary sex organs** of female.

Function: They produce **ova** and female sex hormones- **estrogen** and **progesterone.**

Oviducts: A pair of thin tubular structures which extends from ovary to the uterus.

Functions: Oviduct carries the egg from the ovary to the uterus (womb).

Oviduct is the **site of fertilization.**

Uterus: It is a large, hollow and pear shaped structure. Cervix is the lower narrow part of the uterus which opens into the vagina.

Functions: **Uterus** is the site of **implantation** and **foetal growth**.

It expels the baby during parturition due to rhythmic contractions of its muscles.

Vagina: It is a long muscular tube extends from cervix.

Functions: It acts as copulation canal as it receives sperms during sexual intercourse.
It also acts as birth canal during parturition.

28. How does the embryo get nourishment inside the mother's body?

- The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta.
- This is a disc which is embedded in the uterine wall.
- It contains villi on the embryo's side of the tissue.
- On the mother's side are blood spaces, which surround the villi.
- This provides a large surface area for glucose and oxygen to pass from the mother to the embryo.
- The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta.
- The development of the child inside the mother's body takes approximately nine months.
- The child is born as a result of rhythmic contractions of the muscles in the uterus.

29. What is female foeticide? Why is it prohibited by law?

The reckless killing of female foetus is called female foeticide.

It is the indiscriminate practice of undergoing abortion when the growing foetus is a female.

It is illegal and adversely affects the male-female sex ratio.

Hence prenatal sex determination and female foeticide have been prohibited by law.

30. What are the different methods of contraception?

No	BARRIER METHOD
	Condoms
1	Condoms are barriers made of thin rubber that are used to cover penis in males and vagina in females.
2	Condoms prevent the entry of sperm into the vaginal tract of female.

	INTRAUTERINE DEVICE (IUD)
1	Loop and Copper-T are intrauterine devices. They are placed in the uterus to prevent pregnancy.
2	Loop and Copper-T prevent pregnancy by preventing the implantation of embryo in the uterus.
	Demerit
	They can cause **irritation** of the uterus are may be allergic to the individual.

No	CHEMICAL METHODS, DRUGS OR PILLS
1	In this method, tablets or drugs are taken orally.
2	They change the **hormonal balance** of the body and prevent the release of ova from the ovary.
3	Thus fertilization is prevented and pregnancy is avoided.
	Demerits
	Since they cause **hormonal imbalance,** it may affect the body and cause some side-effects.

	SURGICAL METHOD
No	**Vasectomy**
1	The surgical blocking of vas deferenses in males is called vasectomy.
2	As the vas deferenses of the males are blocked by cutting and tying, transfer of sperms is prevented. So, fertilization could not occur and thus pregnancy is avoided.

No	**Tubectomy**
1	The surgical blocking of fallopian tubes in the females is called tubectomy.
2	As the fallopian tubes of the females are blocked by cutting and tying, the transfer of ovum is prevented. So, fertilization could not occur and thus pregnancy is avoided.

31. What could be the reasons for adopting contraceptive methods?

Contraceptive methods are mainly adopted because of the following reasons:

(i) To prevent unwanted pregnancies.

(ii) To control population rise or birth rate.

(iii) To prevent the transfer of sexually transmitted diseases.

32. If a woman is using a Copper-T, will it help in protecting her from sexually transmitted diseases?

No. Using a copper-T will not provide a protection from sexually transmitted diseases, as it does not prevent the entry of semen. It only prevents the implantation of the embryo in the uterus.

33. Give reasons for the following:

(i) Blocking of Fallopian tubes prevents pregnancy

(ii) Testes are located outside the abdominal cavity

(iii) Pre-natal sex determination has been banned by law

(i) Blocking of fallopian tubes, prevents the transfer of ovum from ovary and hence no fusion of sperm and ovum.

(ii) Testes are located outside the abdominal cavity because **s**perm production requires 2-2.5^{o}C lower than the body temperature.

(iii) Prenatal sex determination has been banned by law:

(a) To avoid indiscriminate female foeticide.

(b) To avoid imbalance in male-female sex ratio.

34. How does reproduction help in providing stability to populations of species?

The rates of birth and death in a given population determine its size.

Reproduction is the process by which organisms increase their populations and help in providing stability to populations of species.

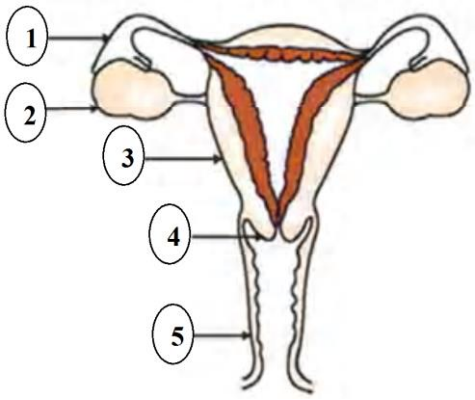
35. (I) Observe the following diagram A and answer the questions given below.

(a) Identify the part of the following diagram which plays dual functions.

(b) Write the dual functions.

(c) Identify the part where fertilisation takes place.

Diagram: A



(II) Observe the following diagram B and answer the questions given below.

(a) Name the type of movement occurs in the following diagram.

(b) What does the zygote become?

(c) Identify the male and female germ cells.

Diagram: B

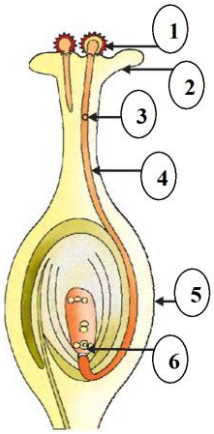


Diagram: A

(a) No: 2. Ovary

(b) Production of female gamete-**ovum** and secretion of **female sex hormones** estrogen and progesterone

(c) No: 3 fallopian tube

Diagram: B

(a) Chemotropism.

(b) Zygote becomes embryo.

(c) No: 3 Male gamete & No: 6 Egg.

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