Std.: 10 (English) **Science - II**

Chapter: 3

Q.1 **Textbook activity question.** **8**

1 What do we mean by maintenance of species?

Ans i. The process of reproduction helps to increase the number of organisms of a species by which the species can prevent itself from being extinct .
ii. This is called as maintenance of species.

2 Whether the new organism is genetically exactly similar to earlier one that has produced it?

Ans No. The new organism produced from the old one is not genetically exactly similar to the parents. In meiotic cell division there is crossing over in the homologous chromosomes. This produces genetic recombination. Thus the new organism is different from the earlier one. However, if the reproduction is of asexual type, then the young one is exactly similar to the parents.

3 What would have been happened if any of the cells in nature had not been divided by meiosis?

Ans Meiosis is necessary for sexual reproduction and for increasing genetic diversity. If any of the cells in nature had not been divided by meiosis then all sexually reproducing animals would have no offspring. Only asexually reproducing animal could have survived on his Earth. This would lead to the extinction of the advanced diploid species.

4 What is the relationship between the cell division and formation of new organism of same species by earlier existing organism?

Ans i. In case of asexual reproduction, the parent cell divides to form two similar daughter cells. This occurs by the type of cell division called mitosis.
ii. In case of sexual reproduction , gametes are formed by the type of cell division called meiosis . These gametes fuse to form a new organism.

5 Who determines whether the two organism of a species will be exactly similar or not?

Ans DNA played the major role in determining the similarity then comes the environmental factor that impacts on the behavior of organism.

6 What is the role of chromosomes in cell-division?

Ans As the genetic material passes from parents to child, the chromosomes are responsible for containing the instruction that make the offspring unique while still carrying traits from their parents.

7 What would have been happened if the male and female gametes had been diploid?

Ans If the male and female gamete were diploid then the number of chromosomes in each generation would have continued to double and this would result in an increasing number of chromosomes.
The number of chromosomes in a particular species should remain a constant generation after generation.

8 Which are main types of cell-division? What are the differences?

Ans i. 'mitosis ' and 'meiosis' are the two main types of cell division.
ii. Mitosis occurs in the somatic cells and stem cells of the body , whereas meiosis occurs in germ cells.
iii. In mitosis , the chromosome number remains the same and two daughter cells are obtained from one cell.
iv. In meiosis , chromosomes number is reduced to half and four daughter cells are obtained from one cell.

Q.2 **Name the following** **6**

1 Types of twins.

Ans Monozygotic and Dizygotic twins.

2 Any two sexual diseases.

Ans AIDS, Syphilis and gonorrhea

3 The hormones related with male reproductive system.

Ans Testosterone

4 Two methods of family planning.

Ans i. Barrier methods such as use of condoms.
ii. Hormonal contraception such as pill
iii. Implant of Intra Uterine Device (IUD)
(Any Two)

5 The hormones secreted by ovary of female reproductive system.

Ans Estrogen

6 Methods of family planning.

Ans Temporary methods : Use of condoms, Oral contraceptive pills, Copper-T, etc.
Permanent / Surgical methods : Vasectomy (in males), Tubectomy (in females).

Q.3 Write Short Notes on **2**

1 In-vitro fertilization (IVF).

Ans i. In Vitro Fertilization (IVF) is one of the advanced medical techniques, with the help of which couples who cannot have children can have a baby/child.
ii. In this technique, fertilization of an oocyte with a sperm is brought about in a test tube and the embryo formed is implanted in the uterus of a woman at the appropriate time.
iii. The IVF technique is used for having a child in case of those childless couples who have problems like less sperm count, and obstacles in the oviduct.

Q.4 Write properties/characteristics/uses/advantage/effects. **2**

1 Which precautions will you follow to maintain the reproductive health?

Ans i. A person's state of being physical, mental and social strength is called as health.
ii. There is a lack of awareness regarding reproductive health due to various reasons like social customs, traditions, illiteracy, shyness, etc.
iii. Occurrence of menstrual cycle is related with reproductive and overall health of women.
iv. Bleeding occurs during menstrual cycle. Due to this, private organs(genitals) need to be maintained clean from time to time, otherwise, problems regarding reproductive health may arise.
v. Some problems regarding the reproductive health may arise in men too. It is essential to maintain the cleanliness of their genitals.

Q.5 Answer the following. **4**

1 Explain the concept of IVF.

Ans (i) It is also known as in-vitro fertilization.
(ii) In this process, sperm is collected from the father or any male donor and similarly, an ovum is collected from the mother or any female donor, then this is fertilized in the laboratory using sterilizing conditions.
(iii) Now when the embryo is formed, it is transferred to the mother or the surrogate.
(iv) Embryo up to 8 blastomere stage is transferred in the fallopian tube whereas blastomere more than 8 blastomeres is transferred in the uterus.
(v) The process is carried out in a laboratory along with high precision and a sterilized environment and these methods are a part of Assisted Reproductive Technology (ART).
(vi) Though these processes are difficult and high precision should be maintained they have many helped many couples who were unable to conceive.

2 Explain the process of fertilization.

Ans (i) While one takes good care of his/her physical health, reproductive health is

usually ignored.

(ii) During the menstrual cycle, a lot of bleeding occurs. Due to this, private organs (genitals) need to be maintained clean from time to time, otherwise problems may arise.

(iii) Men also need to maintain the cleanliness of their genitals to avoid problems.

(iv) Proper hygiene must be observed to prevent sexual diseases caused by bacterial infections, such as syphilis and gonorrhoea.

(v) After childbirth, in order to let the uterus recover to normal health, the woman must take enough rest and avoid carrying heavy objects.

Q.6 Give explanation using the given statements. **6**

1 Modern techniques like surrogate mother, sperm bank and IVF technique will help the human beings. Justify this statement.

OR

'Surrogacy, In Vitro Fertilization (IVF), Sperm Bank/ Semen Bank etc. modern technology will be useful to humans.' support this statement.

OR

Explain the following concepts in short:

(a) Surrogacy

(b) In Vitro Fertilization (IVF)

(c) Sperm Bank

Ans i. Sometimes, couples are not able to have children due to problems like irregularity in menstrual cycle, difficulties in oocyte production, obstacles in the oviduct, and difficulties in implantation in the uterus, in case of females. Similarly in males, it could be absence of sperms in the semen, slow movement of sperms, etc.

ii. Earlier, there was no solution for these problems.

iii. However, nowadays due to advancement in medical technology, new techniques have evolved which enable such couples to have their own children.

iv. Some of these techniques are:

(a) **Surrogacy:** Some women have problems with implantation of embryo in the uterus. Such women can take the help of this technique to give birth to a child. In surrogacy, the oocyte from the ovary of a woman having problems in implantation of embryo in the uterus, is fertilized in a test tube by using the sperms from her husband. The embryo formed is implanted in the uterus of another woman having normal uterus. Such a woman in whose uterus the embryo is planted is called the surrogate mother.

(b) **In Vitro Fertilization (IVF):** This technique is used for those couples who have problems like, less sperm count in man, and obstacles in the oviduct of woman. In this technique, fertilization is brought about in a test

tube and the embryo formed is implanted in the uterus of the woman at an appropriate time.

(c) **Sperm Bank/Semen Bank:** In case of men whose sperm count is much lesser than required, they can use the services of a sperm bank. A sperm bank is similar to blood bank. Semen ejaculated by donor men is collected after thorough physical and medical check-up of the donor and stored in the sperm bank. As per the wish of a needful couple, the oocyte of woman of the concerned couple is fertilized by IVF technique using the semen from sperm bank. Resultant embryo is implanted in the uterus of the same woman. Name of the semen donor is strictly kept secret as per the law.

Hence, modern techniques like surrogacy, sperm bank, and IVF technique will help human beings

2 The gender of a child is determined by the male partner of the couple. Explain with reasons whether this statement is true or false.

OR

'Whether a couple shall have a male child or female child totally depends upon the husband.' Prove the truthfulness of this statement with scientific reasons.

Ans i. This statement is true. The male partner is responsible for the gender of the child.

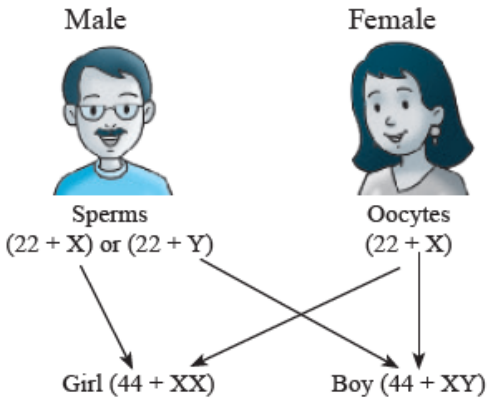
ii. The number of pairs of chromosomes in a human cell is 23, out of which one pair comprises the sex chromosomes.

iii. The chromosomes in this pair are similar (XX) in females and dissimilar (XY) in males.

iv. These cells divide during meiosis. So in a female, oocytes are produced of only one type i.e. (22 + X) and in males two types of sperms are produced (22 + X) and (22 + Y).

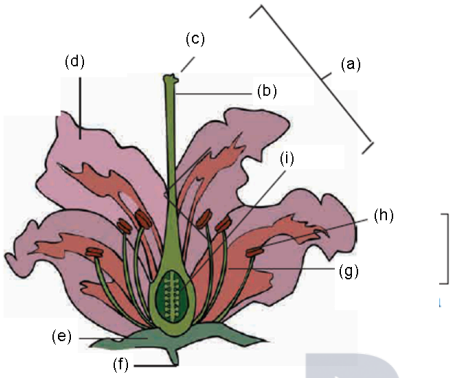
v. At the time of fertilization, if X chromosome comes from the male partner, the child will be a girl and if Y chromosome comes from the male partner, then the child will be a boy.

vi. Hence, the male partner of the couple determines whether they will have a boy or a girl child.

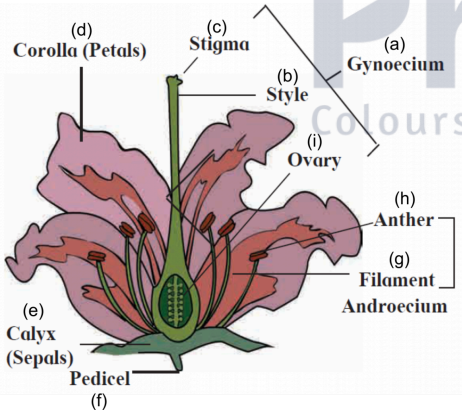


Q.7 **Complete the incomplete diagram** 3

1 Label the diagram : Flower with its sexual reproductive organs.



Ans



Q.8 **Complete the table/ web/ flow chart** 3

1

	ASEXUAL REPRODUCTION	SEXUAL REPRODUCTION
i.	Reproduction that occurs with the help of somatic cells is called as asexual reproduction	.....
ii.	.....	Male and female parent are necessary for sexual reproduction.
iii.	This reproduction occurs with the help of mitosis only.	.....
iv.	.....	New individual formed by this method is genetically different from parents.
v.	Asexual reproduction occurs in different individuals by various methods like binary fission, multiple fission, budding,	.....

	fragmentation, regeneration, vegetative propagation, spore production, etc.	

Ans

	ASEXUAL REPRODUCTION	SEXUAL REPRODUCTION
i.	Reproduction that occurs with the help of somatic cells is called as asexual reproduction	**Reproduction that occurs with the help of two germ cells is called as sexual reproduction.**
ii.	**Only one parent is necessary for asexual reproduction.**	Male and female parent are necessary for sexual reproduction.
iii.	This reproduction occurs with the help of mitosis only.	**This reproduction occurs with the help of meiosis at the time of gametogenesis and then by mitosis.**
iv.	**New individual formed by this method is identical to its parent.**	New individual formed by this method is genetically different from parents.
v.	Asexual reproduction occurs in different individuals by various methods like binary fission, multiple fission, budding, fragmentation, regeneration, vegetative propagation, spore production, etc.	**Sexual reproduction occurs in multicellular plants and animals including humans**

Q.9 Explain with the help of examples **9**

1 Explain with examples about asexual reproduction in unicellular organism - **Multiple Fission**

Ans Multiple Fission:

i. Asexual reproduction by multiple fission is performed by Amoeba and other similar protists.
ii. Amoeba stops formation of pseudopodia and thereby movements whenever there is lack of food or any other type of adverse condition.
iii. It becomes rounded and forms protective covering around plasma membrane. Such encysted Amoeba or any other protist is called as 'Cyst'.
iv. Many nuclei are formed by repeated nuclear divisions in the cyst. It is followed by cytoplasmic division and thus many amoebulae are formed.
v. They remain encysted till there are adverse conditions.
vi. Cyst breaks open on arrival of favourable conditions and many amoebulae are released.

2 Explain with examples about asexual reproduction in unicellular organism - **Binary Fission**

Ans Binary Fission:

i. Prokaryotes(bacteria), Protists(Amoeba, Paramoecium, Euglena, etc.)and eukaryotic cell organelle like mitochondria and chloroplasts perform asexual reproduction by binary fission.
ii. In this process, the parent cell divides to form two similar daughter cells.
iii. Binary fission occurs either by mitosis or amitosis.
iv. Binary fission is usually performed by living organisms during favorable conditions i.e. availability of abundant food material.

3 Explain with examples about asexual reproduction in unicellular organism - **Budding**

Ans Budding:

i. Asexual reproduction occurs by budding in yeast- a unicellular fungus.
ii. Yeast cell produces two daughter nuclei by mitotic division, so as to reproduce by budding. This yeast is called as parent cell.
iii. A small bulge appears on the surface of parent cell. This bulge is actually a bud.
iv. One of the two daughter nuclei enters this bud.
v. After sufficient growth, bud separates from the parent cell and starts to live independently as a daughter yeast cell.

Q.10 Complete the sentences in paragraph **3**

1 Complete the paragraph:

(Luteinizing hormone, endometrium of uterus, follicle stimulating hormone, estrogen, progesterone, corpus luteum, Ovarian follicle along with oocyte, ectometrium of uterus)

Growth of follicles present in the ovary occurs under the effect of ..... . This follicle secretes estrogen. ..... grows/regenerates under the effect of estrogen. Under the effect of ....., fully grown up follicle bursts, ovulation occurs and ..... is formed from remaining part of follicle. It secrets ..... and ..... . Under the effect of these hormones, glands of ..... are activated and it becomes ready for implantation.

Ans Growth of follicles present in the ovary occurs under the effect of **follicle stimulating hormone**. This follicle secretes estrogen. **Ovarian follicle alongwith oocyte** grows/regenerates under the effect of estrogen. Under the effect of **luteinizing hormone**, fully grown up follicle bursts, ovulation occurs and **corpus luteum** is formed from remaining part of follicle. It secrets **estrogen** and **progesterone**. Under the effect of these hormones, glands of **endometrium of ulterus** are activated and it becomes ready for implantation.

Q.11 Answer the following **6**

1 In case of sexual reproduction, new born show similarities about characters. Explain this statement with suitable examples.

Ans
i. Sexual reproduction always occurs with the help of two germ cells – the female gamete and male gamete.
ii. Two main processes occur in sexual reproduction -
(a) Gamete formation: Gametes are formed by the process of meiosis. In meiosis, the chromosome number is reduced to half; hence haploid gametes are formed.
(b) Fertilization: A diploid zygote is formed in this process by union of haploid male and female gametes. The zygote divides by mitosis and the embryo is formed. The embryo develops to form a new individual.
iii. Two parents, i.e. a male parent and a female parent are involved in this type of reproduction. Fusion of a male gamete and a female gamete occurs.
iv. Due to this, the new individual always has recombined genes of both the parents.
v. Hence, the new individual shows similarities to both the parents for some characters, and some characters are different from both the parents.
vi. Examples: 1. The colour of the offspring's skin, eye, and hair may be similar to or different from that of a parent.
2. The offspring's height may be similar to or different from that of a parent.

2 Explain sexual reproduction in plants.

Ans
i. In plants, flower is the structural unit of sexual reproduction.
ii. In a flower, the ovary produces female germ cell or egg and the pollen grain produces the male germ cell.
iii. Ovary contains one or many ovules. Embryo sac is formed in each ovule by meiosis. Each embryo sac consists of a haploid egg cell and two haploid polar nuclei.
iv. When the pollen lands on the stigma of gynaecium, it germinates producing a pollen tube which grows downwards to each ovary.
v. Each pollen tube contains two male gametes which are released near the egg.
vi. One male gamete fuses with the egg cell to form zygote. This is called fertilization.
vii. The second male gamete fuses with two polar nuclei in the embryo sac to form endosperm. This is called as double fertilization.
viii. The zygote develops into embryo and the endosperm serves as nutritive tissue for the growing embryo.
ix. This embryo is capable of growing into a new plant.

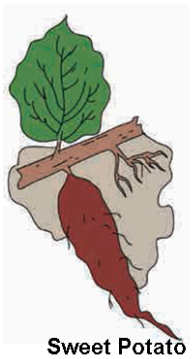
Q.12 Answer the following in detail **20**

1 Draw and explain asexual reproduction in plants.
OR
Explain asexual reproduction in plants.

Ans
i. The process of formation of new organism by an organism of same species without the involvement of gametes is called as asexual reproduction.
ii. Reproduction in plants with the help of vegetative parts like root, stem, leaf and bud is called as vegetative reproduction.
iii. Vegetative propagation in potatoes is performed with the help of 'eyes' present on tuber whereas in Bryophyllum it is performed with the help of buds present on leaf margin.
iv. In case of plants like sugarcane and grasses, vegetative propagation occurs with the help of buds present

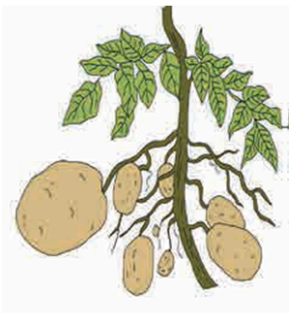
on nodes.

v. Plants like carrot and radish perform vegetative propagation with the help of roots.



Sweet Potato

Bryophylum



Potato

2 What is menstrual cycle ? Describe it in brief ?

Ans i. The female reproductive system undergoes some changes at puberty and those changes repeat at the interval of every 28-30 days. These repetitive changes are called as menstrual cycle.

ii. Menstrual cycle is a natural process, controlled by four hormones.

iii. Those hormones are follicle stimulating hormone (FSH), luteinizing hormone (LH), estrogen and progesterone.

iv. One of the several follicles in the ovary starts to develop along with the ooctye present in it, under the effect of follicle stimulating hormone. This developing follicle secretes estrogen.

v. Endometrium of the uterus starts to develop or regenerate under the effect of estrogen.

vi Meanwhile, developing follicle completes its development. It bursts under the effect of luteinizing hormone and oocyte is released. This is called as ovulation.

vii. Remaining tissue of the burst follicle forms the corpus luteum. Corpus luteum starts to secrete progesterone.

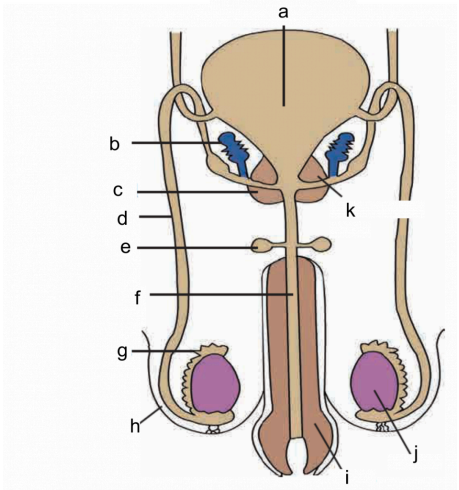
viii. Endometrial glands secrete their secretion under the effect of progesterone. Such endometrium is ready for implantation of embryo.

ix. If the oocyte is not fertilized within 24hours, corpus luteum becomes inactive and transforms into corpus albicans.

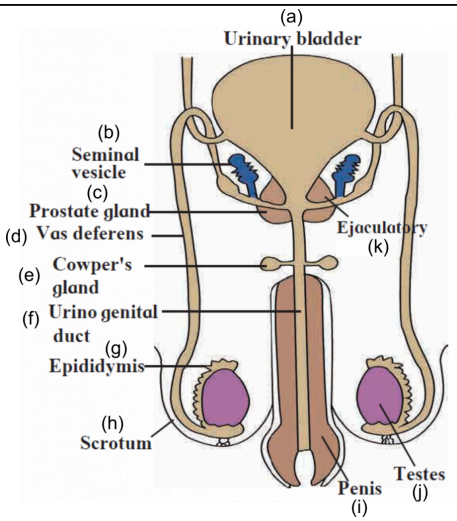
x. Due to this, secretion of estrogen and progesterone stops completely. Endometrium starts to degenerate in the absence of these two hormones.

xi. Tissues of degenerating endometrium and unfertilized ovum are discarded out through vagina. This is accompanied with continuous bleeding. Bleeding continuous approximately for five days. This is called as menstruation.

3 Label diagram: Human male reproductive system.

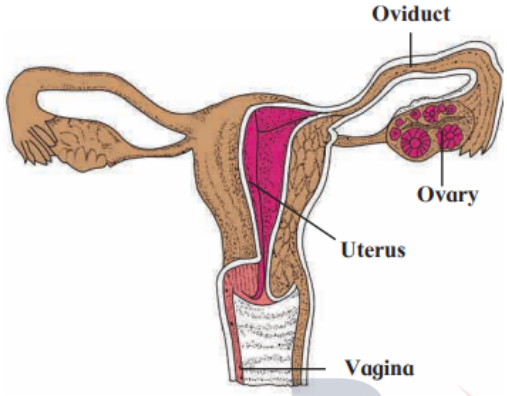


Ans



4 Explain the human female reproductive system with the help of diagram.

Ans



i. All the organs of female reproductive system are in abdominal cavity. It includes a pair of ovaries, a pair of oviducts, single uterus and a vagina.

ii. **Vagina:** It is a muscular tube that extends from the vaginal opening to uterus. It provides the route for the menstrual blood to leave the body during menstruation, it is a pathway through which sperm enters into a woman's body and is a pathway through which the baby comes out during childbirth.

iii. **Uterus:** Uterus is a muscular organ. Due to strong muscle and the ability to expand and contract, the uterus can accommodate a growing foetus and can push the baby during labour.

iv. **Oviducts:** These connect uterus to the ovary. Cilia are present on inner surface of the oviduct. These cilia push the oocyte towards the uterus. O viaduct is the sate of fertilization.

v. **Ovaries:** Two oval shaped organs lie to the upper right and left of the uterus. They develop and release eggs into the oviduct. Generally, every month an ovum is released in abdominal cavity alternatively from each ovary.