

**EXAM
DRILL**

How do Organisms Reproduce?

ANSWERS

1. Tuber of potato is the swollen underground stem and bears number of nodes or eyes. Each eye bears one or many buds. New plants are produced from the buds on the eyes of the stem tuber.

OR

Vegetative propagation is the process of formation of the plant from vegetative propagules or units, such as stem, root, leaf, buds, etc.

2. The secondary sex organs of human female are external genitalia (vulva) and mammary glands.
3. (c)
4. Placenta is a physiological connection between an embryo and uterine wall of the mother through which nutrients and other useful substances enter into fetus from mother's blood and waste products like urea and carbon dioxide are expelled by fetus into mother's blood.
5. Menarche is the starting phase of menstrual cycle and menopause is the cessation or ending phase of menstrual cycle.
6. Flower is the brightly coloured reproductive part of a plant that takes part in sexual reproduction. It is the characteristic of angiosperms and is not found in any other group of plants.

OR

Ovary is primary reproductive organ in human females.

7. Ovulation takes place in ovary.
8. Regeneration in case of lizards is the regrowth in the injured region. *E.g.*, broken tail of wall lizard.
9. Acrosome contains proteolytic enzymes (sperm lysins) that breaks outer membrane of the ovum, called the zona pellucida, allowing haploid nucleus of sperm to join with haploid nucleus of the ovum.

OR

The process of formation of new DNA strands from the older ones is called replication of DNA.

10. Reproduction is a life process that helps in multiplication of an organism and growth of its population.

11. *Plasmodium*

OR

Fission is the type of asexual reproduction in which the fully grown parental organism divides into two or more daughter cells.

12. Regeneration was first reported by Trembley in *Hydra*.

OR

Totipotent cells are certain undifferentiated cells which can differentiate into any type of cells depending upon requirement.

13. External budding is found in *Hydra* while internal budding is found in *Spongilla*.

14. (b) : Surgical intervention blocks gamete transport and thereby prevents conception. Sterilisation procedure in the male is called 'vasectomy' and in the female, 'tubectomy'. In vasectomy, a small part of the vas deferens is removed or tied up through a small incision on the scrotum whereas in tubectomy, a small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina.

15. (a)

16. (c) : Both the sperms released by a pollen tube are involved in fertilisation. The phenomenon is unique to angiosperms and is called double fertilisation. The nucleus of one of the sperms fuses with the egg nucleus (syngamy) and that of the other fuses with the two polar nuclei. The second fertilisation involves the fusion of three nuclei (sperm with two polar nuclei). This phenomenon is called triple fusion.

OR

(b) : Gametogenesis is the production of haploid gametes by diploid multicellular organisms through the process of meiosis. The production of female gametes or ova (egg) is called oogenesis and the production of spermatozoa (sperm) is called spermatogenesis. Oogenesis occurs within the follicles of the ovaries. The meiosis of oocytes always results in haploid cells of

unequal size. When a primary oocyte undergoes meiosis a large haploid secondary oocyte and a very small first polar body result. A second meiotic division produces a large ootid and very small second polar body. The first polar body may or may not divide during the second meiotic division into two additional second polar bodies. All the polar bodies are nonfunctional.

17. (i) (b) : The tiny spores of bread mould (*Rhizopus*) are always present in air. On coming in contact with moist surface of bread slice they settle on it and germinate to form new fungal hyphae which first look like white cottony mass and later turns black.

(ii) (a) : *Mucor* (fungus) reproduces asexually through spore formation.

(iii) (d)

(iv) (c) : Bacteria produce endospore which is a dormant and tough structure that enables bacteria to remain dormant for extended periods under unfavorable conditions.

(v) (d)

18. (i) (a)

(ii) (b)

(iii) (c)

(iv) (a) : Many plants like strawberry and raspberry are propagated by the natural layering methods because these plants have runners (soft horizontal stem running above the ground). Whereas the ends of such runners touch the ground and new plants are formed.

(v) (d)

19. (i) (b) : X could be syphilis, Y could be AIDS and Z could be gonorrhoea.

(ii) (c) : Human immunodeficiency virus (HIV) cause immunodeficiency syndrome, a condition characterised by progressive failure of immune system allowing life threatening conditions.

(iii) (d)

(iv) (d)

(v) (b) : Sterilised needles are free from any kinds of germs.

20. (i) (c) : The sexual cycle in females is called menstruation or menstrual cycle.

(ii) (b) : The breakdown and removal of the inner, thick and soft lining of the uterus along with its vessels in the form of vaginal bleeding is called menstrual flow

or menstruation.

(iii) (d) : Menstrual cycle in human females is about 28 days.

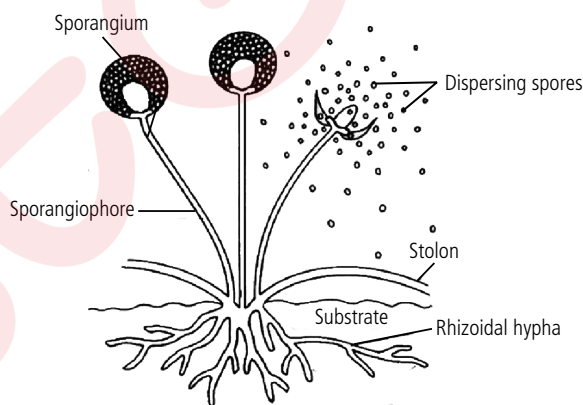
(iv) (d)

(v) (d)

21. Spore formation is the process of formation of microscopic reproductive structures called spores. These spores when detach from the parent give rise to a new individual. Reproduction by the formation of spores is a common method of asexual reproduction in some bacteria and most of the fungi.

OR

Following figure shows the process of spore formation in *Rhizopus*:



22. Two advantages of spore producing organisms are:

(i) Some spores help organism to survive during harsh environmental conditions as spores are covered by thick walls which protect them until they come in contact with moist surface and germinate.

(ii) Spores are generally very small and light. Therefore, it ensures easy dispersal by wind, water and animal.

23. General process of growth refers to different types of developmental processes in the body like increase in height, weight, changes in shape and size of the body whereas sexual maturation involves specific changes which occur in the body of an organism at puberty like maturation of gonads, growth of body hairs, cracking of voice in males, development of breasts in females, etc.

OR

The uterus prepares itself every month to receive a fertilised egg. As a result, its lining becomes thick and spongy that would be required for nourishing the

developing embryo. If fertilisation does not take place, the lining of uterus slowly breaks down and comes out through the vagina as blood and mucus, along with unfertilised egg which is known as menstruation.

- 24.** Multiple fission is a type of division in which many individuals are formed from a single parent cell. This method of reproduction occurs in unfavourable conditions. The unicellular organism develops a protective covering called cyst, over the cell. The nucleus of the cell divides repeatedly producing many nuclei. Later on, each nucleus is surrounded by small amount of cytoplasm and many daughter cells are produced within the cyst.
- 25.** The benefits of using mechanical barriers such as condoms and diaphragms during sexual act are:-
- They prevent the deposition and entry of sperms in the female genital tract during copulation thus they serve as an effective method to avoid pregnancy.
 - They also protect against various sexually transmitted diseases like AIDS, syphilis, etc.
- 26.** After implantation of young embryo, circulation of blood around the uterus is increased. Soon embryo derives its nutrition from the mother's blood with the help of a special tissue called placenta. This contains villi like structure embedded in the wall of uterus. Tissue and blood capillaries of uterus surround villi. Through the villi, nutrients and oxygen from mother's blood pass on to the embryo. The wastes produced by the embryo is passed on to mother's blood through the placenta.
- 27.** The two reproductive parts of a bisexual flower which contain the germ cells are carpel (female reproductive part) and stamen (male reproductive part). Carpel is situated in the centre of the flower as a flask-shaped structure. A carpel is made up of three parts—stigma, style and ovary. The distal part of a carpel is called stigma. Stigma is responsible for receiving pollen during pollination.
- Style is an elongated tubular structure which connects stigma with ovary. The basal swollen part of carpel is ovary. Ovary bears several ovules. After fertilisation ovules form seeds and ovary forms the fruit.

OR

(a) The infectious (communicable) diseases, which spread from an infected person to a healthy person by sexual contact, are called sexually transmitted diseases.

- Bacterial infection-gonorrhoea and syphilis.
- Sexually transmitted diseases caused by virus are AIDS (Acquired Immunodeficiency Syndrome) and genital warts.

(b) Preventive measures for the sexually transmitted diseases are:

- educating people in high risk groups
- mutually faithful monogamous relationship
- avoiding prostitution
- using condoms.

- 28.** Pollination is the process of transfer of pollen grains from the anther of a flower to the stigma of the same or another flower. Pollen grains bear male gametes which are carried to the ovary of a flower with the help of pollen tubes. Hence, pollination brings male gametes in close proximity to the female reproductive part. Hence, if there is absence of pollination, fertilisation will not occur on account of non-availability of male gamete.

- 29.** HIV stands for Human Immunodeficiency Virus.

Yes, AIDS is an infectious disease. It is transmitted sexually or through exposure to contaminated blood.

Four modes of spreading AIDS are :

- Unprotected sex with an infected partner
- Use of contaminated needle and syringes
- Use of contaminated razors for shaving
- Transfusion of infected blood or blood products.

- 30.** Differences between gamete and zygote are:

S. No.	Gamete	Zygote
(i)	Gamete is the germ cell that takes part in fertilisation during sexual reproduction.	Zygote is the product of fertilisation, formed by fusion of male and female gametes.
(ii)	Gamete is haploid. There are two types of gametes - sperm in male and ovum in female.	Zygote is diploid.
(iii)	Gamete carries characteristic of one parent only.	Zygote contains characteristics of both the parents.

Gamete is a reproductive cell. It is of two types – sperm and ovum, each having one set of chromosomes obtained

from respective parent. During sexual reproduction, haploid sperm and ovum fuse together to form diploid zygote. The latter grows by mitosis to develop into embryo and subsequently forms the new individual.

31. The full form of DNA is deoxyribonucleic acid. It is located in the nucleus of a cell in the form of chromosomes. It contains information for the inheritance of characteristics from the parents to the next generation. Copying of DNA is an essential part of the process of reproduction because it makes possible the transmission of parental characteristics to its offspring in the next generation. At the time of replication two copies of DNA are formed. DNA copying is accompanied by creation of additional cellular apparatus and then DNA copies separate, each with its own cellular apparatus. Thus, a cell divides to form two daughter cells.

32. Reproduction is the only process to ensure the continuity of a species. During reproduction, DNA passes from one generation to the next. Copying of DNA takes place with consistency but with minor variations. This consistency leads to stability of species. Hence, reproduction is linked to stability of a species population. By reproduction, organisms produce large number of new individuals of their own kind out of which several get perished and only some survive. These surviving organisms replace the naturally dying members of the population. Hence, the population as a whole is not affected and remains stable.

33. Sperms formed in testes are passed into the vas deferens (pl. vasa deferentia). The vasa deferentia loop over the urinary bladder where they are joined by ducts from seminal vesicles to form ejaculatory ducts. Seminal vesicles are one pair of sac like structures which produce mucus and watery alkaline fluid containing nutrients (fructose). Ejaculatory ducts join urethra and receive secretions of prostate gland and Cowper's gland. Prostate gland is a single large gland that pours its secretion into urethra, through small ducts. It secretes milky fluid which helps in the mobility of sperms. Cowper's glands secrete an alkaline fluid into the urethra that neutralises acids from urine. Urethra is about 20 cm long in males which runs through penis and opens to outside through male genital pore. At the time of sexual excitement, the erectile tissue of penis gets filled with blood causing penis to become erect. It is inserted into the vagina of the female where sperms are ejaculated.

34. (i) Testes : The two testes in male are the sites where male gametes, i.e., sperms are formed. Testes also produce the male sex hormone called testosterone.

(ii) Seminal vesicles : Paired sac-like structures present near the base of bladder. Seminal fluid is a watery alkaline fluid that contains nutrients (fructose) which serve as a source of energy for the sperm. Each seminal vesicle releases its contents into the ejaculatory duct during ejaculation.

(iii) Vas deferens : This is a straight tube, about 40 cm long, which carries the sperms to the seminal vesicles, where mucus and a watery alkaline fluid containing fructose, mix with the sperms.

(iv) Ureter : From hilum of each kidney emerges out a slender, whitish tube called ureter. Ureter of each kidney leaves from the renal pelvis. Each ureter is about 30 cm long, 3 - 4 mm in diameter and opens into urinary bladder by slit-like aperture. The ureters carry urine from kidneys to urinary bladder.

(v) Prostate gland : It is a single large gland that surrounds the urethra and produces a milky, slightly acidic secretion. Secretion of prostate gland nourishes and activates the sperm to swim.

OR

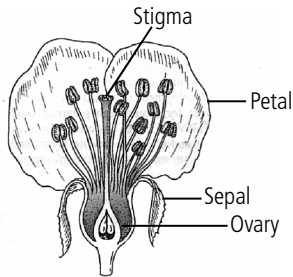
When the ovum (or egg) is fertilised in the oviduct, then a zygote is formed. The zygote divides rapidly by mitosis as it moves down slowly in the oviduct and forms a ball of cells. This hollow ball of cells, called an embryo sinks into the soft and thick lining of the uterus and gets embedded in it. The embedding of embryo in the thick lining of the uterus is called implantation.

After implantation, a disc-like special tissue develops between the uterus wall (called uterine wall) and the embryo (or fetus), which is called placenta. The fetus is connected to placenta in mother's body through umbilical cord. It is through the placenta that all the requirements of the developing fetus like nutrition, respiration and excretion, etc., are met from the mother's body.

The time period from the fertilisation upto the birth of the baby is called gestation. The average gestation period in humans (or the average duration of human pregnancy) is about nine months. During the gestation period, the fetus grows to become a baby. Birth initiates when the strong muscles in the walls of the uterus start to contract rhythmically. The rhythmic contraction of uterus muscles gradually pushes the baby out of the mother's body through vagina and a baby is born.

If a sperm is not available at the time of ovulation, then fertilisation of ovum (or egg) does not take place. Since the ovum (or egg) is not fertilised, so the thick and soft uterus lining having lot of blood capillaries in it is not required. The unfertilised ovum dies within a day and the uterus lining also breaks down. The breakdown and removal of the inner, thick and soft lining of the uterus alongwith its blood vessels is called menstrual flow or menstruation.

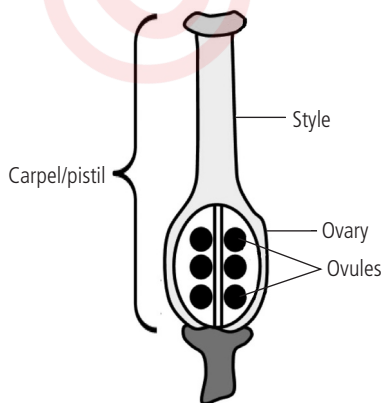
35. (a) The longitudinal section of a flower is as follows :



(b) The reproductive organs of an angiosperm are stamen (male reproductive part) and carpel/pistil (female reproductive part).

A carpel is made of three parts : stigma, style and ovary. The top part of carpel is called stigma. Stigma is for receiving the pollen grains during pollination. Stigma is sticky so that pollen can stick to it. The middle part of carpel is called style. Style is a tube which connects stigma to the ovary. The swollen part at the bottom of a carpel is called ovary. The ovary contains ovules. Ovules contain the female gametes or female sex cells (egg) of the plant. There are usually many ovules in the ovary. Each ovule contains only one female gamete of the plant. Swollen, bilobed stamen consists of anther and stalk called filament. Anther produces pollen grains.

(c) The diagram of the structure of female reproductive part of a flower:



36. Contraception literally means prevention of pregnancy. Different methods for the prevention of pregnancy are as follow:

(i) Barrier methods in which a mechanical barrier such as condom, cervical cap or diaphragm is used for preventing the entry of sperms in the female genital tract or vagina. Thus, sperms and egg do not meet and fertilisation is prevented from taking place.

(ii) Chemical methods of contraception are those in which release of eggs from the ovary can be prevented by the intake of pills by the female. The oral pills are hormonal preparations and are also termed as oral contraceptives.

(iii) Intra-Uterine Contraceptive Devices (IUCDs) are placed in the uterus to prevent pregnancy. These devices are very effective and popularly used by females. Copper-T and Lippes Loop are examples of IUCDs. These devices are placed in the uterus by skilled personnel.

(iv) Surgical method : Contraception can also be brought about by surgically removing or tying a part of vas deferens (vasectomy) in the male and removing or tying a part of fallopian tube (tubectomy) in the female. Surgery should be performed by well trained doctors under sterile conditions.

OR

(a) Some disadvantages of vegetative propagation are:

(i) Plants produced by this technique possess less vigour.

(ii) They are more prone to diseases.

(iii) They show no genetic variations.

(b) Placenta is a specialised tissue between fetus and uterine wall of mother. It develops finger-like processes called villi, which grows into tissue of the uterus.

Functions of placenta are listed below :

(i) Provides nutrition

(ii) Helps in the exchange of gases such as oxygen and carbon dioxide

(iii) Helps in the excretion, that is the removal of nitrogenous waste material from the fetal blood to that of the mother.

(iv) It secretes hormones such as estrogen and progesterone.

(v) Placenta provides protection by partitioning the blood of the fetus and the mother. Thus, unwanted materials such as germs cannot contaminate the blood of the fetus.

(vi) Acts as a storage of glycogen. This glycogen gets converted to glucose and fulfils the energy requirement of the fetus.

