How Do Organisms Reproduce

Case Study Based Questions

Case Study 1

All the reproductive methods of living organisms are broadly categorized into two types: 1. Asexual reproduction, and 2. Sexual reproduction. Asexual reproduction involves the participation of a single parent without the formation of gametes, fertilisation and transfer of genetic material. This method is a common means of rapidly increasing offsprings under favourable conditions.

Read the above passage carefully and give the answer of the following questions:

Q1. Name the type of fission that occurs in Leishmania and Plasmodium.

Q2. Write one advantage of sexual mode of reproduction over asexual reproduction.

Q3. Give reasons why:
(i) Colonies of yeast fail to multiply in water but multiply in sugar solution.
(ii) Rhizopus individuals do not grow on a dry slice of bread.

Or

Name the filamentous structures a student could identify when he collected water from a pond that appeared dark green. How do these organisms multiply? Explain. (CBSE 2023)

Answers

1. Leishmania - Binary fission
Plasmodium - Multiple fission

2. Organisms produced by sexual reproduction have a greater survival rate as compared to asexual reproduction as more variations are produced which are important for the survival of species over time.

3. (i) Yeast cells fail to multiply in water because water does not provide any nutrition to yeast cells. Whereas in sugar solution, they multiply rapidly because sugar provides

nutrition to carry out reproduction.
(ii) Rhizopus individuals do not grow on a dry slice of bread because microorganisms need optimum temperature and moisture to grow and if there is no moisture they will not grow.

Or

The filamentous structures are of Spirogyra.
Reproduction in Spirogyra: Spirogyra reproduces through fragmentation in which spirogyra filaments simply breaks into two or more fragments on maturation and each fragment then grows into a new spirogyra individual.

Case Study 2

The modes by which various organisms reproduce depend on the body design of the organisms. In asexual reproduction, a single individual parent produces offsprings without the involvement of gametes. This method is a common means of increasing the offsprings rapidly under favourable conditions. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals. (CBSE 2022 Term-2)

Read the above passage carefully and give the answer of the following questions:

Q1. State the name of the organism in which binary fission takes place in a definite orientation. Also name the disease caused by this organism.

Q2. Leaves of 'Bryophyllum' when they fall on the soil develop into new plants whereas a banana leaf will not be able to do so. Why?

Q3. (i) Explain the process of budding in Hydra.
(ii) What happens when

Or

(a) a spirogyra filament matures and attains a considerable length and
(b) a sporangia in Rhizopus bursts on maturation?

Answers

1. In Leishmania binary fission takes place in a definite orientation. It causes kala-azar.

2. The leaves of Bryophyllum have buds in their margins (or edges). When these leaves fall on the ground, the buds develop into a new plant by process of vegetative reproduction. The leaves of banana don't produce any buds and hence cannot produce new plants.

3. (i) Hydra use regenerative cells for reproduction in the process of budding. In Hydra, bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from parent body and become new independent individuals.

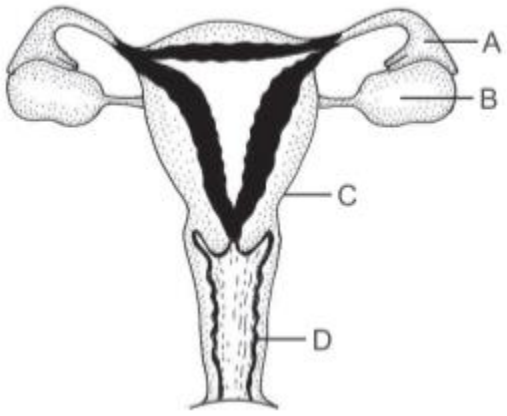
Or

(ii) (a) A mature Spirogyra breaks into smaller pieces or fragments and each fragment then develops into new individuals.
(b) When the sporangia of Rhizopus bursts upon maturation, the spores spread out. Under favourable conditions, these spores germinate to form new individuals.

Case Study 3

The female reproductive system includes the ovaries, fallopian tubes, uterus, vagina and mammary glands. These organs are involved in the production and transportation of gametes and the production of sex hormones. The female reproductive system also facilitates the fertilisation of ova by sperm and supports the development of offspring during pregnancy and infancy.

Read the above passage carefully and give the answer of the following questions:



Q1. In which part do the sperms enter?

Q2. In which part does fertilisation take place?

Q3. In which part does the foetus develop?

Q4. Which structures in human female are equivalent to the following structures in the male?
(i) Testes
(ii) Vas deferens
In each case say in what respect the structures are equivalent?

Q5. Mention one function of part B.

Answers

1. Part D (vagina)

2. Part A (oviduct)

3. Part C (uterus)

4. (1) Ovaries in female; both make gametes.
(ii) Oviducts in female; both transport gametes.

5. The function of ovary (part B) is to generate and release female gametes, i.e., the eggs.

Case Study 4

The growing size of the human population is a cause of concern for all people. The rate of birth and death in a given population will determine its size. Reproduction is the process by which organisms increase their population. The process of sexual maturation for reproduction is gradual and takes place while general body growth is still going on. Some degree of sexual maturation does not necessarily mean that the mind or body is ready for sexual acts or for having and bringing up children. Various contraceptive devices are being used by human beings to control the size of population. (CBSE 2020)

Read the above passage carefully and give the answer of the following questions:

Q1. List two common signs of sexual maturation in boys and girls.

Q2. What is the result of reckless female foeticide?

Q3. What is contraception?

Q4. Which contraceptive method changes the hormonal balance of the body?

Q5. Write two factors that determine the size of a population.

Answers

1. Two common signs of sexual maturation in boys and girls are as follows:
(i) Appearance of hairs on various body parts such as armpits and the genital area between the thighs.
(ii) The skin frequently becomes oily and might begin to develop pimples.

2. Because of reckless female foeticides, child sex ratio is declining at an alarming rate in our society.

3. Any method which prevents conception or pregnancy is called contraception.

4. Chemical method of contraception (oral pills) changes the hormonal balance of the body.

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

Solutions for Questions 5 to 19 are Given Below

Case Study 5

Read the following and answer any four questions from 1(i) to 1(v).

There are two organisms X and Y that produce new offspring from single parent only. Organisms X when reaches its maximum growth, divides its body into two new organisms. The parent organism does not exist any more and two new daughter organisms grow fully and divide again.

Organism Y form a small outgrowth on its body called bud which detaches and develops into new organism.

Read the above paragraph and answer the questions that follow.

(i) Select the option that correctly identifies organisms X and Y.

	X	Y
(a)	*Amoeba*	Yeast
(b)	*Paramecium*	*Hydra*
(c)	*Leishmania*	*Sycon*
(d)	All of these	

(ii) Select the correct statement.

(a) Organism X reproduces asexually whereas organism Y reproduces sexually.

(b) Organism X must be multicellular whereas organism Y should be unicellular.

(c) Both organisms X and Y reproduce asexually.

(d) Both organisms X and Y are always multicellular organisms.

(iii) Identify the mode of reproduction in organisms X and Y.

(a) X - Multiple fission
Y - Binary fission

(b) X - Binary fission
Y - Budding

(c) X - Regeneration
Y - Fragmentation

(d) X - Fragmentation
Y - Multiple fission

(iv) Which of the following is incorrect ?

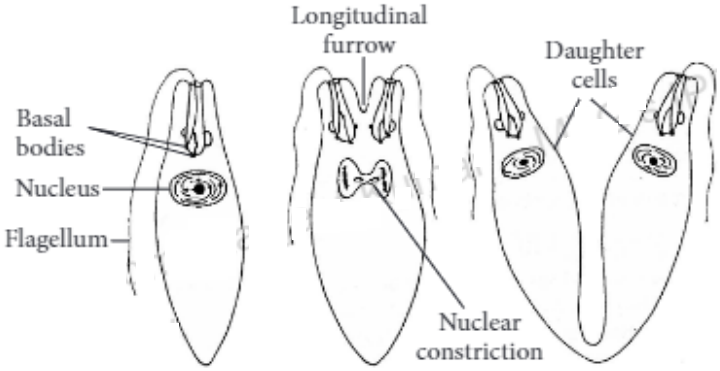
(a) *Plasmodium* reproduces by the same method as is adopted by organism X.

(b) Organism X could be any multicellular plant like *Riccia*, *Sphagnum*, etc.

(c) If organism Y is *Hydra*, then it may also reproduce through regeneration.

(d) Both (a) and (b)

(v) Which organism reproduces by the method shown in the given figure?



(a) *Planaria* (b) *Amoeba* (c) *Euglena* (d) *Paramecium*

Case Study 6

Read the following and answer any four questions from 2(i) to 2(v).

Spore formation, method of asexual reproduction is used by unicellular as well as multicellular organisms. Spores are microscopic units which could be air borne or are present in soil, etc.

(i) A slice of bread kept in open for sometime shows growing white cottony mass which later turns black. This happens because
- (a) bacterial spores present in air germinate on the surface of bread slice
- (b) fungal spores present in air germinate on the surface of bread slice
- (c) protozoan microbes start feeding on bread slice
- (d) none of these.

(ii) Spore formation can be seen in

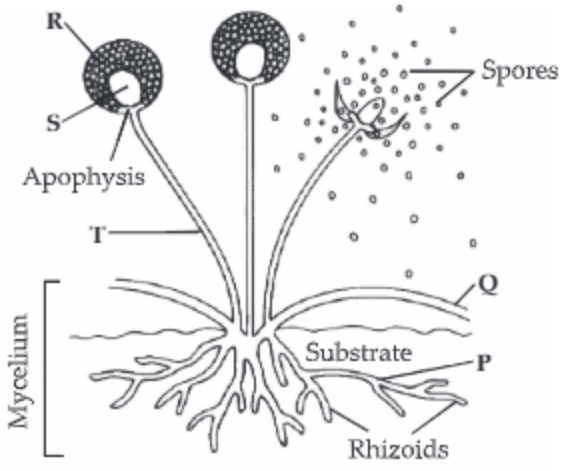
(a) *Mucor* (b) sweat potato (c) *Spirogyra* (d) all of these.

(iii) Bulb like structure at top of erect hyphae where spores are produced is

(a) sporangiophore (b) apophysis (c) columella (d) sporangia.

(iv) Select the incorrect statement.
- (a) Spores can be produced endogenously or exogenously in an organism.
- (b) Spores can be air borne or soil borne.
- (c) Bacteria produce only exospores.
- (d) *Rhizopus* bears spores in special structures called sporangium.

(v) Observe the given figure showing spores formation in *Rhizopus* and select the option which is correctly labelled.



(a) P-Stolon, S-Columella, T-Sporangiophore
(b) Q-Stolon, P-Hypha, S-Sporangium
(c) R-Sporangium, S-Apophysis, T-Sporangiophore
(d) Q-Stolon, R-Sporangium, S-Columella

Case Study 7

Read the following and answer any four questions from 3(i) to 3(v).

Radhika collected some pond water which was dark green in colour in a test tube. She took out green coloured mass from it and separated its filaments by using needles. She broke some filaments into small fragments and put them in a Petri dish containing clean water. She observed that after few days the small fragments gave rise to complete filaments.

(i) What do you think the mass of green filament was?
(a) It was a mass of *Spirogyra* filament.
(b) It was a colony of *Volvox* algae.
(c) It was kelp, *i.e.*, large brown algae.
(d) It was a mass of fungal filaments or hyphae.

(ii) The small fragment gave rise to new filament. What does it indicate?
(a) *Spirogyra* reproduces asexually through fragmentation.
(b) *Spirogyra* reproduces asexually through vegetative propagation.
(c) *Spirogyra* reproduces asexually through budding.
(d) *Spirogyra* reproduces asexually through fission.

(iii) Organism which reproduces in similar way as *Spirogyra* is
(a) yeast
(b) sea anemone
(c) *Entamoeba*
(d) all of these.

(iv) Select the correct statement.
(a) Only multicellular organisms can undergo fragmentation.
(b) Both unicellular and multicellular organisms can undergo fragmentation.
(c) Fragmentation is sexual mode of reproduction.
(d) Fragmentation is found only in algae.

(v) Which among the given organisms do not reproduce by fragmentation?
(a) *Riccia*
(b) *Selaginella*
(c) *Aurelia*
(d) *Marchantia*

Case Study 8

Read the following and answer any four questions from 4(i) to 4(v).

Preeti is very fond of gardening. She has different flowering plants in her garden. One day few naughty children entered her garden and plucked many leaves of *Bryophyllum* plant and threw them here and there in the garden. After few days, Preeti observed that new *Bryophyllum* plants were coming out from the leaves which fell on the ground.

(i) What does the incidence cited in the paragraph indicate?
(a) *Bryophyllum* leaves have special buds that germinate to give rise to new plant.
(b) *Bryophyllum* can propagate vegetatively through leaves.
(c) *Bryophyllum* is a flowering plant that reproduces only asexually.
(d) Both (a) and (b)

(ii) Which of the following plants can propagate vegetatively through leaves like *Bryophyllum*?
(a) Guava
(b) *Begonia*
(c) Ginger
(d) Mint

(iii) Do you think any other vegetative part of *Bryophyllum* can help in propagation? If yes, then which part?

(a) Roots (b) Stems (c) Flowers (d) Fruits

(iv) Which of the following plants is artificially propagated (vegetatively) by stem cuttings in horticultural practices?

(a) Potato (b) Snake plant (c) Rose (d) Water hyacinth

(v) In which of the following pairs both the plants can be vegetatively propagated by leaf pieces?

(a) *Adiantum* and *Kalanchoe* (b) *Chrysanthemum* and *Agave*

(c) *Agave* and *Dioscorea* (d) *Bryophyllum* and *Asparagus*

Case Study 9

Read the following and answer any four questions from 5(i) to 5(v).

Horticultural methods of vegetative propagation multiply desired varieties of plants quickly from parts of their somatic body. A horticulturist used stem cutting of plant X to propagate it in a short span of time. For plant Y, he pulled a branch of towards ground and covered it with soil leaving the tip of branch exposed. He later on cut the branch from parent plant. The former developed into new plant. He propagated plant Z through underground stems called tubers. Identify the propagation methods used by horticulturist and answer the following questions.

(i) What could be plants X, Y and Z?

	X	Y	Z
(a)	*Bougainvillea*	Jasmine	Potato
(b)	Sugarcane	Ginger	Rose
(c)	*Begonia*	Banana	*Chrysanthemum*
(d)	Guava	Onion	Cactus

(ii) Select the propagation methods in plants X, Y and Z.

(a) X - root tubers, Y - stem cutting, Z - stem tubers

(b) X - stem cutting, Y - layering, Z - underground stem

(c) X - layering, Y - underground stem, Z - underground roots

(d) X - grafting, Y - layering, Z - root tubers

(iii) Select the correct statement for plant Z if it is potato.

(a) Each tuber has many buds called ears.

(b) It is necessary to plant the whole potato tuber in the soil to produce new potato plants.

(c) Vegetative propagation of potato plants by tubers is much faster than production of potatoes by seeds.

(d) All of these

(iv) Select the plant which propagates by the same method adopted by gardener for plant Y, but naturally it propagates by stolons

(a) Strawberry (b) *Adiantum* (c) Tulsi (d) Both (a) and (b)

(v) Identify the given vegetative propagule.

(a) Bulb (b) Runner (c) Rhizome (d) Bulbil

Case Study 10

Read the following and answer any four questions from 6(i) to 6(v).

A horticulturist took stems of two different plants; plant X with roots and plant Y without roots Y. He fixed the cut stem X in soil. He fitted and bound tightly the other cut stem Y over the surface of X. He fastened the joint properly with the help of polythene. The cut soon healed and the two plant stems (X and Y) grew together as one plant.

(i) What is not correct of regarding given horticulture practice?

(a) It enables to combine the most desirable characteristics of two plants.

(b) It can be used to produce superior varieties of plants.

(c) It is equally useful for both dicot and monocot plants.

(d) All of these

(ii) What is stem X and stem Y respectively known?

(a) X - stock, Y - scion

(b) X - scion, Y - stock

(c) X - scion, Y - graft

(d) X - graft, Y - scion

(iii) Why is the area where two stems are joined is covered with polythene?

(a) To prevent harmful infection by bacteria or fungus

(b) To prevent the loss of water and plant sap from the cut and joined ends of the stems

(c) To prevent CO_2 and sunlight from entering the joint

(d) Both (a) and (b)

(iv) Select the incorrect option regarding the horticultural practice mentioned in the given paragraph.

(a) The technique mentioned in the given paragraph is known as grafting.

(b) While joining the two stem cuttings, cambium of both stems should be aligned so that the joint is healed properly.

(c) This technique is used to breed fruit trees and flowering bushes.

(d) The shoot system of the plant is always older than the root system.

(v) The given practice is used in which of the following plants?

(a) Apple (b) Spinach (c) Coriander (d) Mint

Case Study 11

Read the following and answer any four questions from 7(i) to 7(v).

In an experiment, a scientist removed some cells from the growing point of a plant and placed it a suitable medium containing nutrients and plant hormones leading to the formation of shapeless lump or mass called X. X is then transferred to another medium which lead to development of roots. X with developed roots is then transferred into another medium that induced the development of shoots. X in this way differentiated into tiny plantlets which were transplanted into pots where they grew into mature plants.

(i) What is X in the given paragraph?

(a) Plantlet (b) Callus (c) Embryoid (d) Tissue

(ii) Which technique has the scientist used for the propagation of plant?

(a) Layering (b) Grafting (c) Tissue culture (d) Cutting

(iii) What is the advantage of the technique mentioned in the paragraph?
(a) It helps in production of disease free plants.
(b) It is a very fast technique as thousand of plantlets can be produced in a few weeks time.
(c) It is also known as micropropagation due to extremely small amount of plant material used for propagation.
(d) All of these

(iv) Select the incorrect statement regarding the propagation technique mentioned in the paragraph.
(a) It is used in the production of ornamental plants like orchids, carnation, *Chrysanthemum,* etc.
(b) It is a modern method of artificial propagation of plants.
(c) Plants produced by this methods are genetically different from the parent plant.
(d) Very little space is needed for developing new plants by this technique.

(v) Which of the following statements is incorrect?
(a) Virus free plants cannot be produced by tissue culture technique.
(b) Tissue culture technique is useful in obtaining homozygous diploid.
(c) Tissue culture is useful in quick propagation of *Gladiolus*.
(d) Tissue culture is artificial method of vegetative propagation.

Case Study 12

Read the following and answer any four questions from 8(i) to 8(v).

Ruchika planted three plants X, Y and Z of different species of flowering plant in her garden. After sometime she observed that fruit development occurred in plant X and Z but not in plant Y. She also observed that plant Z has two slightly different types of flowers.

(i) Why do you think fruit formation did not take place in plant Y?
(a) Plant Y is a cross pollinated plant having only female flowers.
(b) Plant Y is a cross pollinated plant having only male flowers.
(c) Plant Y is a monoecious plant having male and female organs in separate structure.
(d) Plant Y is a self pollinated plant having anther and stigma is in the same flower.

(ii) Which of the following correctly identifies plant X, Y and Z?

	X	Y	Z
(a)	Date palm	Maize	Watermelon
(b)	Papaya	Maize	Mulberry
(c)	*Hibiscus*	Date palm	Papaya
(d)	*Asparagus*	*Ocimum*	Cucurbit

(iii) Select the correct statement.
(a) Plant X could be self pollinated or cross pollinated.
(b) Plant Y must be self pollinated whereas plant Z is cross pollinated.
(c) Plant Y is cross pollinated and plant Z is either self pollinated or cross pollinated.
(d) Both (a) and (c)

(iv) Which of the following holds false for plants X, Y and Z?
(a) If Ruchika covers all the male flowers of plant Z then only cross pollination is possible in plant Z.
(b) Flowers of plant X are always bisexual and incomplete.
(c) Plant Z is self pollinated if it is cucurbit but it is cross pollinated if it is pumpkin.
(d) Plant Y lacks pistils or female reproductive part of plant and produces pollens in large numbers.

(v) Select the correct statement.
(a) Plant Y always requires another plant of same species but of opposite sex for pollination.
(b) Plant Y always needs a pollinating agent.
(c) The process of fertilisation never takes place in plant Y.
(d) All of these

Case Study 13

Read the following and answer any four questions from 9(i) to 9(v).
P and Q are two monoecious plants. P bears bisexual flowers whereas Q bears unisexual flowers. P does not need a pollinating agent whereas pollinating agent is required in case of Q.

(i) Select the option that correctly identifies plant P and Q.
(a) P - Papaya, Q - Marigold
(b) P - Pea, Q - Cucurbit
(c) P - Sunflower, Q - Orchids
(d) P - Tulip, Q - Daffodil

(ii) Select the correct option regarding plants P and Q.
(a) Seed setting is assured in plant P even if all its flowers are emasculated.
(b) Male flowers of plant Q always open only after the female flowers of the plant are pollinated.
(c) Female flowers of plant Q can reproduce by cross pollens or self pollens depending upon the genus to which plant Q belongs to.
(d) P is a cross pollinated plant whereas Q is a self pollinated plant.

(iii) How can self pollination be avoided in plant P?
(a) By removing all the flowers of plant P
(b) By removing all the anthers of all the flowers
(c) By removing all the carpels of all the flowers
(d) None of these

(iv) Which of the following holds true for plant Q?
(a) Plant Q bears complete flowers.
(b) Plant Q bears either male flowers or female flowers but never both.
(c) Sexual reproduction in plant Q may or may not give rise to genetic variations.
(d) All of these

(v) Select the correct statement.
(a) Flowers of plant P produce large number of pollen grains as compared to flowers of plant Q.
(b) Sexual reproduction in plant P does not bring variations.
(c) Sexual reproduction in plant P often gives rise to new varieties due to accumulation of genetic variations.
(d) Both (a) and (b)

Case Study 14

Read the following and answer any four questions from 10(i) to 10(v).
When a human female reaches the age of puberty, a sexual cycle starts which is marked by vaginal bleeding for few days at regular time interval.

(i) What is the sexual cycle in human female that is taking place in reproductive organs in every 28 days and marked by bleeding?
(a) Breeding cycle
(b) Oestrous cycle
(c) Menstrual cycle
(d) Reproductive cycle

(ii) What is the scientific term used for the vaginal bleeding occurring in females at regular interval?
(a) Implantation (b) Menstruation (c) Ovulation (d) Fertilisation

(iii) What is the duration of menstrual cycle in human females?
(a) 10 days (b) 15 days (c) 60 days (d) 28 days

(iv) Why does vaginal bleeding occur in human females on attaining puberty?
(a) Unfertilised egg along with thick uterus lining come out of vagina in form of bleeding.
(b) In human females, ovaries start releasing egg or ovum once every 28 days from the age of puberty.
(c) If fertilisation does not occur then menstrual flow occurs at the end of cycle.
(d) All of these

(v) In what conditions vaginal bleeding will not occur in a human female who has attained puberty?
(a) If the female gets pregnant (b) If there is some hormonal imbalance in female
(c) If the ovum is not fertilised (d) Both (a) and (b)

Case Study 15

Read the following and answer any four questions from 11(i) to 11(v).

A newly married couple does not want have children for few years. They consulted a doctor who advised them barrier method and chemical method of birth control. Yet another couple who already have two children and are middle aged also consulted doctor for some permanent solution to avoid unwanted pregnancy. Doctor advised them surgical method of birth control.

(i) What are the barrier methods of birth control?
(a) Condom (b) Diaphragm (c) Oral pills (d) Both (a) and (b)

(ii) How physical barrier prevent pregnancy?
(a) They kill the sperms. (b) They kill the ovum.
(c) They prevent sperms from meeting the ovum. (d) They prevent intercourse.

(iii) How chemical methods prevent pregnancy?
(a) Vaginal pills contain chemical called spermicides which kill the sperms.
(b) Oral pills prevent ovulation so there will be no fertilisation.
(c) Oral pills stop menstruation in females.
(d) Both (a) and (b)

(iv) Select the correct statement regarding surgical method of birth control.
(a) It involves termination of pregnancies in women particularly after eight weeks of conception.
(b) Small portion of sperm duct or vas deferences in males is removed by surgical operation and both cut ends are ligated properly.
(c) Small portion of oviducts in females is removed by surgical operation and cut ends are ligated.
(d) Both (b) and (c)

(v) Select the correct statement regarding birth control methods.
(a) Barrier method of birth control also protects the couple from sexually transmitted diseases.
(b) Some women experience unpleasant side effects on taking oral pills because of change in hormonal balance in body.
(c) Surgical method in males is called vasectomy and in females is called tubectomy.
(d) All of these

Case Study 16

Read the following and answer any four questions from 12(i) to 12(v).

A married woman used a device X made of common metal for preventing pregnancy. This device was put into her uterus by some trained medical professional. Unfortunately she got pregnant after two months of insertion of device. She was in shock to learn that her birth control device has failed.

(i) What is the name of birth control device used by the woman?

(a) Foam tablets
(b) Copper T
(c) Diaphragm
(d) Both (a) and (b)

(ii) Which metal is commonly used for making device X?

(a) Iron (b) Copper (c) Silver (d) Gold

(iii) How does device X prevent pregnancy?

(a) It prevents ovulation.
(b) It prevents copulation.
(c) It suppresses fertilising capacity of sperm.
(d) None of these

(iv) Why do you think the woman got pregnant even after using device X?

(a) Device X might have got expelled without the knowledge of woman.
(b) Device X might be defective and was not working from the beginning.
(c) Device X could have been destroyed by the uterine fluid.
(d) None of these

(v) Select the correct statement regarding device X.

(a) Device X is very effective in preventing sexually transmitted diseases.
(b) Device X can be inserted in uterus by woman herself.
(c) Device X prevents menstrual cycle in women.
(d) Device X can cause heavy painful and longer duration periods or menstruation.

Case Study 17

Read the following and answer any four questions from 13(i) to 13(v).

X, Y and Z are sexually reproducing organisms. Fertilisation occurs either in external medium (water) or inside the body of organism. Thus two types of gametic fusion are external fertlisation and internal fertilisation. X undergoes external fertilisation whereas Y and Z undergo internal fertilisation. X and Y both release their eggs outside their body.

(i) Select the option that correctly identifies organisms X, Y and Z.

	X	Y	Z
(a)	Fish	Frog	Goat
(b)	Frog	Pigeon	Elephant
(c)	Toad	Gorilla	Sparrow
(d)	Kiwi	Fish	Duck-billed platypus

(ii) Select the correct statement regarding organisms X and Y.

(a) Y produces large number of eggs where X produces single egg at a time.
(b) Fertilisation in case of X occurs in water but fertilisation occurs inside the body of Y.
(c) X could be a reptile whereas Y could be fish or amphibian.
(d) Eggs of X are covered by hard calcareous shell whereas eggs of Y are covered in jelly.

(iii) Select the incorrect statement regarding organisms Y and Z.

(a) Y is oviparous whereas Z is viviparous.
(b) Zygote develops to complete baby in the bodies of organism Y and Z.
(c) Y could be a bird or reptile whereas Z could be a mammal.
(d) Both Y and Z copulate with their female counterparts to transfer sperms in their bodies.

(iv) Select the correct match.

(a) Eggs with calcareous shells – Parrot, King Cobra, Salmon
(b) Eggs with jelly covering – Toad, Eagle, Lizard
(c) Eggs without shell – Cat, Dog, Human
(d) Eggs produced in large numbers at a time – Rohu, Human, Python

(v) Why are eggs of animal X covered in jelly?

(a) To keep the eggs moist and offer some protection from predators
(b) To prevent the egg from breaking
(c) To prevent fertilisation of eggs
(d) All of these

Case Study 18

Read the following and answer any four questions from 14(i) to 14(v).

Menstrual cycle is the cycle of events taking place in female reproductive organs, under the control of sex hormones, in every 28 days. At an interval of 28 days, a single egg is released from either of two ovaries. Regular menstrual cycle stopped abruptly in a married women. She got herself tested and was happy to discover that she is pregnant with her first baby.

(i) Why menstruation stops in a pregnant female?

(a) The egg gets fertilised so need not to be expelled out of body.
(b) Ovulation stops during pregnancy and so do menstruation.
(c) Thick uterine lining is needed for proper development of embryo, so that it is retained.
(d) All of these

(ii) Select the correct sequence of acts that leads to pregnancy in a female.

A. Fertilisation of egg
B. Ovulation
C. Formation of zygote
D. Implantation

(a) D → C → B → A (b) B → A → C → D (c) A → B → C → D (d) D → C → A → B

(iii) How is a zygote different from embryo?

(a) Zygote is formed by repeated division of embryo.
(b) Zygote is formed by fusion of sperm and egg whereas embryo is formed by fusion of zygote with other zygote.
(c) Zygote is single celled but embryo is multicellular.
(d) Zygote is formed by fertilisation but embryo is formed without fertilisation.

(iv) What change takes place in the uterus of a pregnant female?

(a) Uterine lining becomes thick and vascular.
(b) Placenta develops which links the embryo to mother through umbilical cord.
(c) Uterus lining containing lots of blood capillaries breaks down.
(d) Both (a) and (b)

(v) Select the correct statement.

(a) The average duration of human pregnancy is about nine months.

(b) The time period from fertilisation up to the birth of baby is called gestation.

(c) If doctor finds any anomaly in the developing fetus then he may terminate pregnancy at an early stage, known as abortion.

(d) All of these

Case Study 19

Read the following and answer any four questions from 15(i) to 15(v).

X, Y and Z are three sexually transmitted diseases (STDs). X and Z are caused by bacteria whereas Y is caused by virus P. Virus P lowers the immunity of a person and leads to an incurable disease. X starts as painless sores on genitals rectum or mouth. Z causes painful urination and abnormal discharge from genitals.

(i) Select the option that correctly identifies disease X, Y and Z?

	X	Y	Z
(a)	AIDS	Syphilis	Gonorrhoea
(b)	Syphilis	AIDS	Gonorrhoea
(c)	Gonorrhoea	Syphilis	AIDS
(d)	Syphilis	Gonorrhoea	AIDS

(ii) Identify virus P from the given paragraph.

(a) Human papilloma virus

(b) Human adenovirus

(c) Human immunodeficiency virus

(d) Human cytomegalovirus

(iii) What are the symptoms of disease Y?

(a) Weight loss

(b) Fever or night sweats

(c) Fatigue and weakness infections

(d) All of these

(iv) Select the incorrect statement regarding diseases X and Y.

(a) Both X and Y can spread from infected mother to unborn baby during pregnancy.

(b) Both X and Y can spread from infected partner to healthy partner by unprotected sex.

(c) Y can also spread through use of contaminated needles and blood transfusion.

(d) None of these

(v) How can disease Y be prevented?

(a) By following polygamy and having protected sex.

(b) Use of sterilised needles for injecting medicines, blood tests, etc.

(c) Collecting blood from unknown donors without background check by blood bank professionals.

(d) All of these

HINTS & EXPLANATIONS

5. **(i) (d):** According to the given passage, organisms X and Y reproduce by binary fission and budding respectively. *Amoeba, Paramecium* and *Leishmania* reproduce by binary fission whereas *Hydra*, *Sycon* and yeast reproduce by budding.

(ii) (c): Both organisms X and Y are reproducing asexually *i.e.*, by binary fission and budding respectively. Unicellular organisms can undergo binary fission whereas both unicellular (yeast) and multicellular (*Hydra*) organisms reproduce by budding.

(iii) (b)

(iv) (d): *Plasmodium* reproduces by multiple fission. Multicellular plants do not reproduce through binary fission.

(v) (c) : *Euglena* reproduces by longitudinal binary fission.

6. (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)

7. (i) (a) : *Spirogyra* is a green filamentous alga that is found in huge numbers in ponds and lakes.

(ii) (a) : When mature *Spirogyra* breaks into two or more pieces, then each fragment develops into an individual.

(iii) (b)

(iv) (a) : Only multicellular organisms having simple body organisation can undergo fragmentation. It is asexual mode of reproduction.

(v) (c)

8. (i) (d) : *Bryophyllum* propagates vegetatively though buds present on the margins of its leaves.

(ii) (b) : *Begonia* propagates vegetatively through its leaves.

(iii) (b) : If a broken piece of stem of *Bryophyllum* is planted in soil, it develops into a new *Bryophyllum* plant.

(iv) (c) : Rose plants are artificially propagated by stem cuttings. A piece of stem having bud is cut and buried in soil. After few days it develops roots and later on grows into new rose plant.

(v) (a)

9. (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 new plants are formed.

(v) (d)

10. (i) (c) : Grafting technique is not successful in monocot plants as they do not have cambia.

(ii) (a) : The cut stem of a plant having roots and is fixed in soil is called stock. The cut stem of another plant (without roots) is called scion.

(iii) (d)

(iv) (d) : In grafting, stock (root system) is always older than scion (shoot system).

(v) (a) : Grafting is used to breed fruit trees like apple, peach, apricot and pear.

11. (i) (b) : Callus is shapeless, unorganised lump or mass of cells formed by rapid cell division.

(ii) (c) : The production of new plants from small piece of plant tissue (or cells) taken from growing tips of plants in a suitable growing medium is called tissue culture.

(iii) (d)

(iv) (c) : Plants produced by tissue culture are genetically identical to parent plant.

(v) (a) : Cells present in plant tip divide rapidly. Their division rate is higher than that of multiplication of viruses. So these cells remain virus free. These cells or tissue when used for micro propagation given rise to healthy plantlets. Hence, virus free plants can be produced from virus infected plants by tissue culture technique.

12. (i) (b) : Plant *Y* is a dioecious plant with only male flowers. As such flowers lack carpel, fruit formation cannot take place in them.

(ii) (c) : *X* could be any monoecious bisexual plant, *Y* could be a dioecious male plant and *Z* could be a monoecious plant with separate male and female flowers.

(iii) (d) : Plants *X* and *Z* have both types of sex organs present in same flower and different flowers on the same plant respectively. Plant *X* can be self or cross pollinated. Plant *Z* could undergo geitonogamy (a type of self pollination) or cross pollination.

(iv) (b) : When all the four whorls of a flower are present, it is called complete flower. A bisexual flower is generally complete as it has sepals, petals, stamen and pistil.

(v) (d) : Fertilisation takes place inside ovary *i.e.*, female reproductive organ which is present inside female flowers present in female plant.

13. (i) (b)

(ii) (c)

(iii) (b): If anthers of flowers are removed then chances of self pollination become negligible. Cross pollens can be artificially dusted on stigmas of flower to affect cross pollination.

(iv) (c)

(v) (b) : Self pollination does not bring about genetic variations.

14. (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)

15. (i) (d): In barrier methods of preventing pregnancy, the physical devices such as condom and diaphragm are used. Condoms are rubber tubes used by males whereas diaphragm are rubber cups used by females.

(ii) (c) : Physical barriers prevent the sperm from meeting the ovum by acting as a barrier between them.

(iii) (d): Chemical methods of birth control include oral pills and vaginal pills. Oral pills are combination of estrogen and progesterone which prevent ovulation (release of egg during monthly cycle), so they prevent fertilisation. Vaginal pills are inserted in vagina before intercourse and release spermicides which kill sperms.

(iv) (d) (v) (d)

16. (i) (b) : Intrauterine device is placed inside the uterus by a doctor or a trained nurse. Copper T is a common intra-uterine device.

(ii) (b) (iii) (c)

(iv) (a) : Intra-uterine devices are highly effective in preventing unwanted pregnancies. But they come with one disadvantage, that is they can get expelled anytime without the knowledge of women. Couple continue active sexual life thinking that their birth control device is still in action.

(v) (d) : Intra-uterine devices do not protect against sexually transmitted diseases. Periods may become heavier, longer and more painful and there are chances of pelvic infection.

17. (i) (b)

(ii) (b): *X* could be fish or amphibian whereas Y could be bird or reptile. Animals like fish or amphibian produce large number of eggs and sperms which fuse in external medium like water. Animals like birds or reptiles produce few eggs at a time. They lay fertilised eggs which are protected by outermost hard calcareous shell.

(iii) (b): Development of zygote takes place outside the body of *Y* inside the laid egg whereas zygote develops into complete baby inside the body of female *Z*.

(iv) (c) : Cat, dog and human undergo internal fertilisation so their eggs are not covered by calcareous shell or jelly covering.

(v) (a)

18. (i) (d)

(ii) (b): First of all ovulation takes place. Then the eggs get fertilised by sperm. This leads to formation of zygote. Zygote divides to form few celled embryo which gets embedded at the proper site in the thick lining of uterus. This is called implantation.

(iii) (c) : Zygote is formed by fusion of sperm and egg *i.e.*, fertilisation. It is single celled and it gives rise to embryo by repeated cell divisions.

(iv) (d): After implantation, a disc like tissue develops between thick uterine wall and embryo, called placenta. Placenta links the embryo to the mother through umbilical cord. All the requirements of the developing fetus like nutrition, respiration, excretion etc., are met from mother's body through placenta. This is because in placenta, embryo's blood vessels lie in close association with mother's blood vessels.

(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.