CHAPTER

8

REPRODUCTION

Syllabus

Reproduction in animals and plants (asexual and sexual), reproductive health-need and methods of family planning; Safe sex, HIV/AIDS; Child bearing and women's health.

STAND ALONE MCQs (1 Mark each)

Q. 1. Reproduction is essential for living organisms in order to
- **(A)** keep the individual organism alive.
- **(B)** fulfill their energy requirement.
- **(C)** maintain growth.
- **(D)** continue the species generation after generation.

Ans. Option (D) is correct.

> ***Explanation:*** Reproduction serves to continue the species which would otherwise extinct due to struggle for survival and natural/accidental death of individuals.

Q. 2. A feature of reproduction that is common to *Amoeba*, *Spirogyra* and Yeast are that
- **(A)** they reproduce asexually.
- **(B)** they are all unicellular.
- **(C)** they reproduce only sexually.
- **(D)** they are all multicellular. U

Ans. Option (A) is correct.

> ***Explanation:*** All of them reproduce asexually. with single parent and no need of fusion of gametes.

Q. 3. In *Spirogyra*, asexual reproduction takes place by
- **(A)** breaking up of filaments into smaller bits.
- **(B)** division of a cell into two cells.
- **(C)** division of a cell into many cells.
- **(D)** formation of young cells from older cells. U

Ans. Option (A) is correct.

> ***Explanation:*** Fragmentation is a type of asexual reproduction in animals in which parental body is broken down into pieces and each of these pieces develop into an individual animal.

Q. 4. The ability of a cell to divide into several cells during reproduction in *Plasmodium* is called
- **(A)** budding
- **(B)** reduction division
- **(C)** binary fission
- **(D)** multiple fission U

Ans. Option (D) is correct.

> ***Explanation:*** Multiple fission is a repeated division of organism to produce many daughter cells all together.

Q. 5. Factors responsible for the rapid spread of bread mould on slices of bread are
- **(i)** large number of spores.
- **(ii)** availability of moisture and nutrients in bread.
- **(iii)** presence of tubular branched hyphae.
- **(iv)** formation of round shaped sporangia.
- **(A)** (i) and (iii)
- **(B)** (ii) and iv)
- **(C)** (i) and (ii)
- **(D)** (iii) and (iv) R

Ans. Option (C) is correct.

> ***Explanation:*** Bread mould prefers damp and warm substratum with ample supply of nutrients on which its air-borne spores land and germinate to produce mycelium.

Q. 6. In the list of organisms given below, those that reproduce by the asexual method are
- **(i)** Banana
- **(ii)** Dog
- **(iii)** *Yeast*
- **(iv)** *Amoeba*
- **(A)** (ii) and (iv)
- **(B)** (i), (iii) and (iv)
- **(C)** (i) and (iv)
- **(D)** (ii), (iii) and (iv) R

Ans. Option (B) is correct.

> ***Explanation:*** Out of the given options, *Amoeba* (binary fission), *Yeast* (budding) and banana (vegetative propagule) reproduce by asexual reproduction whereas dogs reproduce by sexual method.

AI **Q. 7.** Offspring formed by asexual method of reproduction have greater similarity among themselves because

(i) asexual reproduction involves only one parent.
(ii) asexual reproduction does not involve gametes.
(iii) asexual reproduction occurs before sexual reproduction.
(iv) asexual reproduction occurs after sexual reproduction.

(A) (i) and (ii) **(B)** (i) and (iii)
(C) (ii) and (iv) **(D)** (iii) and (iv) U

Ans. Option (A) is correct.

Explanation: Asexual reproduction does not involve gamete formation and fertilization.

Q. 8. Vegetative propagation refers to formation of new plants from

(A) stem, roots and flowers.
(B) stem, roots and leaves.
(C) stem, flowers and fruits.
(D) stem, leaves and flowers. R

Ans. Option (B) is correct.

Explanation: Flowers are the organs of sexual reproduction in plants.

Q. 9. Asexual reproduction takes place through budding in

(A) *Amoeba* **(B)** *Yeast*
(C) *Plasmodium* **(D)** *Leishmania* R

Ans. Option (B) is correct.

Explanation: Asexual reproduction takes place through budding in yeast.

Q. 10. Which of the following are examples of vegetative reproduction in plants?

(A) Tomato, lady's finger, onion and cauliflower
(B) Potato, ginger, onion and sugarcane
(C) Cauliflower, onion, potato and tomato
(D) Lady's finger, onion, ginger and sugarcane

Ans. Option (B) is correct.

Explanation: Potato, ginger, onion, and sugarcane exhibit vegetative reproduction.

Q. 11. In a flower, the parts that produce male and female gametes (germ cells) are

(A) stamen and anther
(B) filament and stigma
(C) anther and ovary
(D) stamen and style

Ans. Option (C) is correct.

Explanation: In a flower, pollen grains are formed inside the anther, which produces the male gametes while the ovary bears the female gamete.

AI **Q. 12.** Which of the following is the correct sequence of events of sexual reproduction in a flower?

(A) Pollination, fertilisation, seedling, embryo
(B) Seedling, embryo, fertilisation, pollination
(C) Pollination, fertilisation, embryo, seedling
(D) Embryo, seedling, pollination, fertilisation

Ans. Option (C) is correct.

Explanation: The correct sequence of events of sexual reproduction in a flower is pollination, fertilization, embryo, seedling. Pollination is the process of transfer of pollens from stamen to stigma after which fertilization takes place, during which germ cells fuse together to form zygote which in turn leads to embryo formation within the ovule. Fertilized ovule becomes seed and seeds germinate to produce seedling.

Q. 13. The correct sequence of reproductive stages seen in flowering plants is

(A) gametes, zygote, embryo, seedling
(B) zygote, gametes, embryo, seedling
(C) seedling, embryo, zygote, gametes
(D) gametes, embryo, zygote, seedling U

Ans. Option (A) is correct.

Explanation: Gamete formation is followed by pollination and fertilization to produce zygote which in turn leads to embryo formation. Fertilized ovule become seed and seeds germinate to produce seedling.

AI **Q. 14.** Which of the following statements are true for flowers?

(i) Flowers are always bisexual.
(ii) They are the sexual reproductive organs.
(iii) They are produced in all groups of plants.
(iv) After fertilisation they give rise to fruits.

(A) (i) and (iv) **(B)** (ii) and (iii)
(C) (i) and (iii) **(D)** (ii) and (iv)

Ans. Option (D) is correct.

Explanation: Flowers are the sexual reproductive organs of a plant and a fertilized flower gives rise to fruit.

AI **Q. 15.** A student while observing an embryo of a gram seed listed various parts of the embryo as listed below: Testa, Micropyle, Cotyledon, Tegmen, Plumule, Radicle.

On examining the list the teacher commented that only three parts are correct. Select these three correct parts:

(A) Cotyledon, Testa, Plumule
(B) Cotyledon, Plumule, Radicle
(C) Cotyledon, Tegmen, Radicle
(D) Cotyledon, Micropyle, Plumule A

[CBSE Board, Delhi Region, 2016]

Ans. Option (B) is correct.

Explanation: When a plant produces a seed, it has 3 basic parts: plumule (the future shoot), radicle (the future root) and the cotyledons which may be 2 or 1 based on the type of plant being it dicot or monocot, respectively.

Q. 16. Characters that are transmitted from parents to offspring during reproduction show

(A) only similarities with parents
(B) only variations with parents
(C) both similarities and variations with parents
(D) neither similarities nor variations U

Ans. Option (C) is correct.

Explanation: Meiosis during gamete formation and fertilization produce variations while DNA replication ensures similarities.

Q. 17. Length of pollen tube depends on the distance between
(A) pollen grain and upper surface of stigma
(B) pollen grain on upper surface of stigma and ovule
(C) pollen grain in anther and upper surface of stigma
(D) upper surface of stigma and lower part of style

Ans. Option (B) is correct.

Explanation: Pollen tube carries male gametes to ovule and thus, is long equal to the distance between stigma and ovary.

Q. 18. The number of chromosomes in parents and offsprings of a particular species remains constant due to
(A) doubling of chromosomes after zygote formation
(B) halving of chromosomes during gamete formation
(C) doubling of chromosomes after gamete formation
(D) halving of chromosomes after gamete formation U

Ans. Option (B) is correct.

Explanation: Meiosis reduces the chromosome number to half which is then restored by fertilization.

Q. 19. During adolescence, several changes occur in the human body. Mark one change associated with sexual maturation in boys.
(A) Loss of milk teeth (B) Increase in height
(C) Cracking of voice (D) Weight gain

Ans. Option (C) is correct.

Explanation: Cracking of voice is one of the secondary sexual characters of human males observed during adolescence.

Q. 20. In human females, an event that reflects onset of reproductive phase is
(A) growth of body
(B) changes in hair pattern
(C) change in voice
(D) menstruation

Ans. Option (D) is correct.

Explanation: Development of female secondary sexual characters marks onset of puberty and initiation of menstrual cycle reflects onset of reproductive phase.

Q. 21. In human males, the testes lie in the scrotum, because it helps in the
(A) process of mating.
(B) formation of sperm.
(C) easy transfer of gametes.
(D) all of the above.

Ans. Option (B) is correct.

Explanation: Scrotum provides lower temperature needed for sperm formation.

Q. 22. Which among the following is not the function of testes at puberty?
(i) Formation of germ cells
(ii) Secretion of testosterone
(iii) Development of placenta
(iv) Secretion of estrogen
(A) (i) and (ii) (B) (ii) and (iii)
(C) (iii) and (iv) (D) (i) and (iv) U

Ans. Option (C) is correct.

Explanation: Development of placenta and secretion of estrogen are female reproductive functions.

Q. 23. Which of these statement is correct about reproduction ?
(A) It keeps the individual organism alive
(B) It fulfills their energy requirement
(C) It maintains the growth
(D) It continue the species generation after generation

Ans. Option (D) is correct.

Explanation: Reproduction serves to continue the species which would otherwise extinct due to struggle for survival and natural/accidental death of individuals.

AI **Q. 24.** The correct sequence of organs in the male reproductive system for transport of sperms is
(A) testis → vas deferens → urethra
(B) testis → ureter → urethra
(C) testis → urethra → ureter
(D) testis → vas deferens → ureter

Ans. Option (A) is correct.

Explanation: Vas deferens delivers sperms from testes to urethra coming from the urinary bladder.

Q. 25. Which among the following diseases is not sexually transmitted?
(A) Syphilis (B) Hepatitis
(C) HIV - AIDS (D) Gonorrhoea

Ans. Option (B) is correct.

Explanation: Hepatitis is water borne viral disease.

Q. 26. Which of the following is not a part of the female reproductive system in human beings? R
(A) Ovary (B) Uterus
(C) Vas deferens (D) Fallopian tube

Ans. Option (C) is correct.

Explanation: Vas deferens is not a part of the female reproductive system in human beings.

ASSERTION AND REASON BASED MCQs (1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is NOT the correct explanation of A.

(C) A is true but R is false.

(D) A is false and R is true.

Q. 1. Assertion (A): *Amoeba* reproduces by binary fission.
Reason (R): All unicellular organisms reproduce asexually.

Ans. Option (A) is correct.

> ***Explanation:*** *Amoeba* is a unicellular organism. It reproduces asexually through binary fission. It is the division of one cell into two similar or identical cells.

Q. 2. Assertion (A): Plants are vegetatively propagated even though they bear seeds.
Reason (R): Potatoes reproduces through tubers, apples by cutting etc.

Ans. Option (B) is correct.

> ***Explanation:*** Vegetative reproduction happens through the use of vegetative parts of the plants, such as leaves, stems, and roots to produce new plants or through growth from specialized vegetative plant parts.

Q. 3. Assertion (A): Characteristics of parental plants can be preserved through asexual reproduction.
Reason (R): Vegetative reproduction involves only mitosis.

Ans. Option (A) is correct.

> ***Explanation:*** Asexual reproduction involves a single individual, which give rise to new individual that are genetically identical to parents. It is because, when organisms reproduce asexually, only mitotic divisions are involved and the chromosome number remains the same.

Q. 4. Assertion (A): *Plasmodium* reproduces by multiple fission.
Reason (R): Multiple fission is a type of asexual reproduction.

Ans. Option (B) is correct.

> ***Explanation:*** *Plasmodium* reproduces asexually by multiple fission.

Q. 5. Assertion (A): DNA copying is necessary during reproduction.
Reason (R): DNA copying leads to the transmission of characters from parents to offspring.

Ans. Option (A) is correct.

> ***Explanation:*** DNA copying is necessary during reproduction because it leads to the transmission of characters from parents to offsprings and brings about variation.

Q. 6. Assertion (A): An embryo is formed from fertilized egg.
Reason (R): A monocot embryo comprises embryonal axis with two cotyledons.

Ans. Option (C) is correct.

> ***Explanation:*** Zygote, a fertilized egg give rise to an embryo, which has the ability to develop into a complete plant. A typical dicot embryo comprises an embryonal axis with two cotyledons.

Q. 7. Assertion (A): Unisexual flowers have separate male and female flowers whereas a typical monocot embryo comprises an embryonal axis with single cotyledon.
Reason (R): Cucumber, pumpkin and water melon are example of unisexual flowers.

Ans. Option (B) is correct.

> ***Explanation:*** Unisexual flowers have separate male and female flowers. The example includes cucumber, pumpkin and watermelon.

Q. 8. Assertion (A): Double fertilisation is unique to angiosperms.
Reason (R): Triple fusion occurs in asexual reproduction.

Ans. Option (C) is correct.

> ***Explanation:*** Double fertilization is a characteristic feature of flowering plants. In this process, out of the two sperm nuclei, one sperm nucleus fuses with the egg nucleus to form an embryo (process is called syngamy) and another fuses with the secondary nucleus to form an endosperm (process is called triple fusion). Because two kinds of fusion—syngamy and triple fusion—take place, the process is known as double fertilisation.

Q. 9. Assertion: Fertilization results in formation of zygote.
Reason: Zygote divides several times to form an embryo.

Ans. Option (B) is correct.

> ***Explanation:*** Fertilization is a process which involves fusion of male and female germ cells to form zygote. This zygote divides several times to form an embryo. The ovule develops a thick coat and changes into seed. The ovary grows rapidly and ripens to form the fruit.

Q. 10. Assertion (A): Sexual reproduction increases genetic diversities and plays a role in origin of new species.

Reason (R): Sexual reproduction involves formation of gametes and fusion of gametes.

Ans. Option (A) is correct.

> ***Explanation:*** Sexual reproduction involves two parents that results in the offsprings that are not identical to the parents. It causes variations; which are essential for evolution as well as survival of species under unfavourable conditions.

Q. 11. Assertion (A): In human male, testes are extra-abdominal organs which are present inside scrotum.

Reason (R): Scrotum has a relatively lower temperature needed for the production and storage of sperms.

Ans. Option (A) is correct.

> ***Explanation:*** Formation of sperm needs lower temperature than the normal body temperature. Hence, testes lie outside the body cavity in the scrotum.

Q. 12. Assertion (A): At puberty, in boys, voice begins to crack and thick hair grows on face.

Reason (R): At puberty, there is decreased secretion of testosterone in boys.

Ans. Option (C) is correct.

> ***Explanation:*** Puberty in boys is regulated by male sex hormone called **testosterone,** which are secreted by testes. In puberty, secondary sexual characters like growth of hair on face, chest, broadening of shoulders and deepening of voice occurs.

Q. 13. Assertion (A): Surgical methods are most effective methods of contraception.

Reason (R): Surgical method blocks gametes transport and hence prevent fertilisation.

Ans. Option (A) is correct.

> ***Explanation:*** Surgical method like vasectomy in male and tubectomy in female prevent pregnancy. These methods block gamete transport and hence prevent fertilisation. They are very effective but reversibility is very poor.

CASE-BASED MCQs

Attempt any 4 sub-parts from each question. Each sub-part carries 1 mark.

I. Read the following passage and answer any four questions from Q.1. to Q.5.

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.

Q. 1. What are common signs of sexual maturation in boys is:

(A) Broadening of shoulders
(B) Development of mammary glands
(C) Broadening of waist
(D) High pitch of voice

Ans. Option (A) is correct.

> ***Explanation:*** Development of mammary glands or breast, broadening of waist and high pitch of voice are the characters of maturation in female

Q. 2. Common sign of sexual maturation in girls is:

(A) Low pitch voice
(B) Appearance moustache and beard
(C) Development of mammary gland
(D) Broadening of shoulders

Ans. Option (C) is correct.

> ***Explanation:*** Development of mammary gland is the character of female maturation while Low pitch voice, appearance of moustache and beard, broadening of shoulders

Q. 3. Which contraceptive method changes the hormonal balance of the body?

(A) Condoms **(B)** Diaphragms
(C) Oral pills **(D)** Both (a) and (b)

Ans. Option (C) is correct.

> ***Explanation:*** Oral pills are responsible to prevent ovulation in the female body by hotmonal change while condoms and diaphragm are only contraceptive barrier that doesn't bring any hormonal changes.

Q. 4. Write two factors that determine the size of a population.

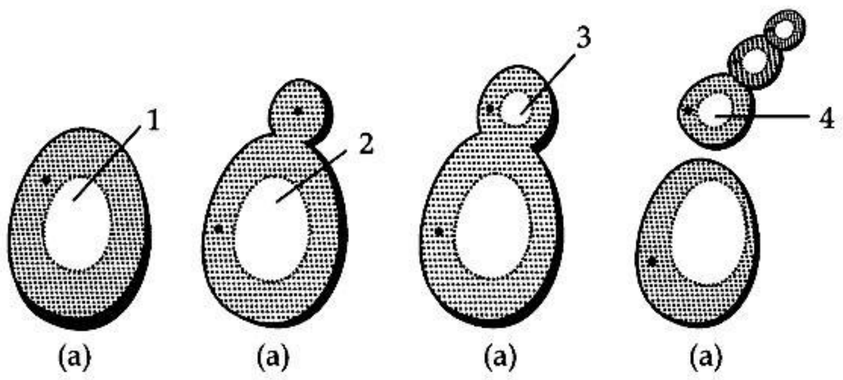
Ans. Factors are: Birth rate and death rate.

Q. 5. What should be maintained for a healthy society?

(A) rate of birth & death rate
(B) male & female sex ratio
(C) child sex ratio
(D) None of these A [Delhi- Set-I, 2020]

Ans. Option (B) is correct.

AI II. Study the diagram given below and answer any four questions from Q.1. to Q.5.



Q. 1. Identify the above process.

(A) Binary fission **(B)** Budding
(C) Fragmentation **(D)** Regeneration

Ans. Option (B) is correct.

> ***Explanation:*** Budding is a type of asexual reproduction wherein a daughter organism is formed from a small projection known as bud.

Q. 2. Which organism uses the above method for reproduction?

(A) Yeast **(B)** *Amoeba*
(C) *Spirogyra* **(D)** *Leishmania*

Ans. Option (A) is correct.

> ***Explanation:*** Yeast reproduces asexually by budding.

Q. 3. An organism capable of reproducing by two asexual reproduction methods one similar to the reproduction in yeast and the other similar to the reproduction in *Planaria* is:

(A) *Spirogyra* **(B)** *Hydra*
(C) *Bryophyllum* **(D)** *Paramecium*

Ans. Option (B) is correct.

> ***Explanation:*** *Hydra* reproduces asexually by budding (as yeast) and by regeneration (as Planaria).

Q. 4. A *Planaria* worm is cut horizontally in the middle into two halves P and Q such that the part P contains the whole head of the worm. Another Planaria worm is cut vertically into two halves R and S in such a way that both the cut pieces R and S contain half head each. Which of the cut pieces of the two *Planaria* worms could regenerate to form the complete respective worms?

(A) Only P **(B)** Only R and S
(C) P, Rand S **(D)** P, Q, R and S

Ans. Option (D) is correct

> ***Explanation:*** *Planaria* reproduces asexually by regeneration. It is the ability of a fully differentiated organism to give rise to new individual organisms from its body parts. Small cut or broken parts of the organism's body grow or regenerate into separate individuals.

Q. 5. Among the following select the statements that are true regarding the sexual reproduction in flowering plants?

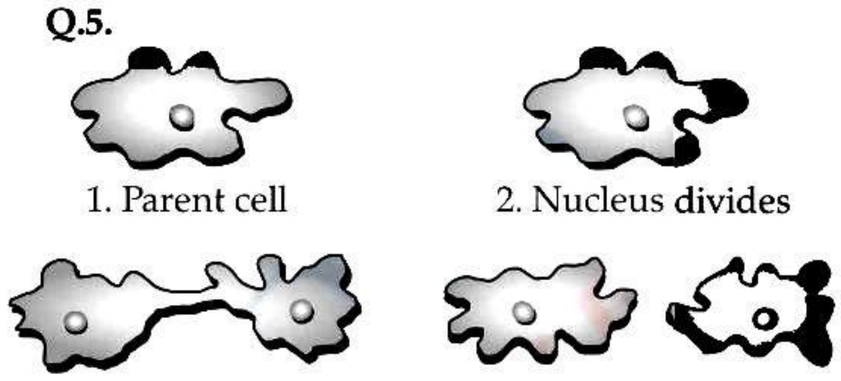
(1) Fertilisation is a compulsory event
(2) It always results in the formation of zygote
(3) Offsprings formed are clones
(4) It requires two types of gametes

(A) (1) and (4) **(B)** (1), (2) and (3)
(C) (1), (2) and (4) **(D)** (2), (3) and (4)

Ans. Option (B) is correct.

> ***Explanation:*** Sexual reproduction in flowers require two types of gametes. The fusion of gametes results in the formation of the zygote. This process is termed as fertilisation.

III. Study the process depicted in the picture given below and answer any four question from Q.1. to Q.5.



Q. 1. Which of these organisms divides by the above process?

(A) *Amoeba* **(B)** *Spirogyra*
(C) *Leishmania* **(D)** *Yeast*

Ans. Option (A) is correct.

> ***Explanation:*** Amoeba reproduces asexually by binary fission. It is the division of one cell into two similar or identical cells. The nucleus first divides amitotically into two, followed by the division of the cytoplasm. The cell finally splits into two daughter cells.

Q. 2. In multiple fission :

(A) Two daughter cells are produced.
(B) Many daughter cells are formed **simultaneously.**
(C) Two types of gametes fuse together
(D) None of these

Ans. Option (B) is correct.

> ***Explanation:*** **Binary fission:** Two daughter cells are produced.
> **Multiple fission:** Many daughter cells are formed simultaneously.

Q. 3. Which of the following statement is correct about the above type of reproduction?

(A) It involves two individuals.
(B) It involves a mature parent cell.
(C) It involves union of two types of gametes.
(D) All of these

Ans. Option (B) is correct.

> ***Explanation:*** Asexual reproduction involves a single parent.

Q. 4. Which of these statement is correct about the fission in Leishmania?

(A) Splitting into two cells during division can take place in any plane.
(B) Binary fission occurs in a definite orientation in relation to the whip like structure.

(C) Both of these
(D) None of these

Ans. Option (B) is correct.

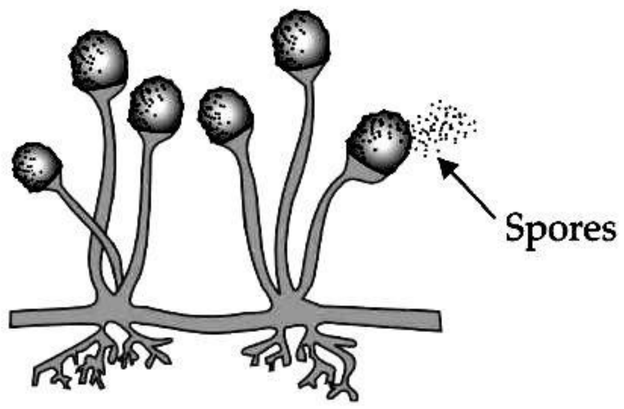
Explanation: In *Amoeba*, splitting into two cells during division can take place in any plane.
In *Leishmania*, binary fission occurs in a definite orientation in relation to the whip like structure.

Q. 5. Which of these are the characteristics of vegetative reproduction?
(i) Involves two individuals
(ii) Daughter cells are genetically identical to the parent.
(iii) The cell division is only mitotic.
(A) (i) and (ii) only **(B)** (i) and (iii) only
(C) (ii) and (iii) only **(D)** All of these

Ans. Option (C) is correct.

Explanation: The characteristic features of vegetative reproduction are: cell division take place by mitosis and daughter cells formed are genetically identical to the parent.

IV. Study the given diagram and answer any four questions from Q.1. to Q.5 as given below:



Q. 1. The above diagram depicts:
(A) Spore formation in *Rhizopus*
(B) Fragmentation in *Spirogyra*
(C) Binary fission in *Amoeba*
(D) Spore formation in Yeast

Ans. Option (A) is correct.

Explanation: Spore formation takes place in *Rhizopus*.

Q. 2. 'Blobs' that develop at the tips of the non-reproductive thread is known as :
(A) Hyphae **(B)** Sporangia
(C) Spores **(D)** Pollens

Ans. Option (B) is correct.

Explanation: *Rhizopus* consists of fine thread like projection called hyphae. It has a knob like structure which is involved in reproduction called sporangia. Each sporangium contains hundreds of black spores which gets dispersed into air to germinate on suitable substratum.

Q. 3. The thread like non-reproductive structures is :
(A) Hyphae **(B)** Rhizoids
(C) Sporangium **(D)** Sporangiophores

Ans. Option (A) is correct.

Explanation: *Rhizopus* consists of fine thread like projection called hyphae.

Q. 4. On maturation sporangia of given organism bursts and releases :
(A) Pollens **(B)** Spores
(C) Seeds **(D)** None of these

Ans. Option (B) is correct.

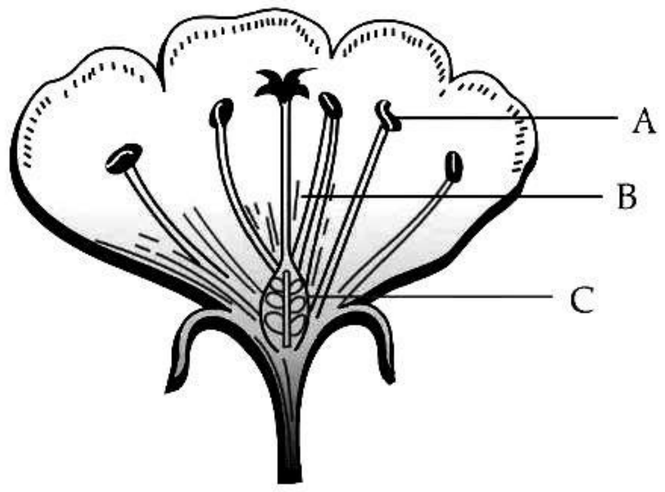
Explanation: On maturation sporangia of given organism bursts and releases spores.
They germinate into new individuals under favourable conditions.

Q. 5. Which of these plants reproduces in the same way as the given process?
(A) Balsam **(B)** Fern
(C) Mango **(D)** *Hibiscus*

Ans. Option (B) is correct.

Explanation: Fern reproduces by spores.

AI V. The given diagram represent the structure of a flower. Study the structure and answer any four questions from Q.1. to Q.5.



Q. 1. The labels A, B and C are
(A) Anther, Style and Ovary respectively.
(B) Stamen, Stigma and Ovule respectively.
(C) Anther, Style and Stigma respectively.
(D) Stamen, Fragment and Ovary respectively.

Ans. Option (A) is correct.

Explanation: In the given picture, A represents anther, B represents style and C represent ovary.

Q. 2. Which of these is the function of part labelled as C?
(A) Contains ovules which develop into seeds.
(B) Attracts pollinators.
(C) Protect rising buds.
(D) Receive pollens

Ans. Option (A) is correct.

Explanation: The part labelled as C is Ovary. Ovary contains ovule which develops into seeds while ovary forms the fruit.

Q. 3. When an insect sits on the flower of a plant then some particles from the little stalks in the flowers sticks to its body and when this insect sits on the flower of another plant, the particles get deposited in that flower. What are these particles?
(A) Dust **(B)** Pollens

(C) Grains (D) Seeds

Ans. Option (B) is correct.

> ***Explanation:*** Pollen is a powdery substance consisting of pollen grains which are male microgametophytes of seed plants, which produce male gametes (sperm cells).

Q. 4. A student decides to study the impact of removing certain flower parts on fruit formation in plant species X. He chooses three separate plants that are growing in the same plot under uniform conditions. The data is given in the table below.

Plants	Part Removed	Impact on formation
1.	Anther	30% less fruit formed than average plants in the plot
2.	Stigma	No fruit formed
3.	Petal	No significant impact

Which of the following can be inferred from the above data?

(A) Anthers and stigmas are crucial in sexual reproduction in species X.

(B) Pollen grains are probably unable to germinate if they land on other parts of the carpel besides the stigma.

(C) Species X is likely to be wind-pollinated.

(D) Species X relies completely on cross-pollination.

Ans. Option (C) is correct.

> ***Explanation:*** The removal of anthers affects fruit formation in plant 1, this implies that species X relies partially on self-pollination. The removal of either anthers or stigmas affects rate of fruit formation significantly. No fruits are observed when the stigmas in plant 2 are removed. This shows that pollen grains are probably unable to germinate if they land on any other part of the carpel besides the stigma. The petals do not seem to play a significant role in facilitating fruit formation. Species-X is therefore likely to be wind-pollinated with reduced petals.

Q. 5. Which of these events does not take place after fertilisation ?

(A) Formation of zygote.

(B) Development of thick coat around ovule.

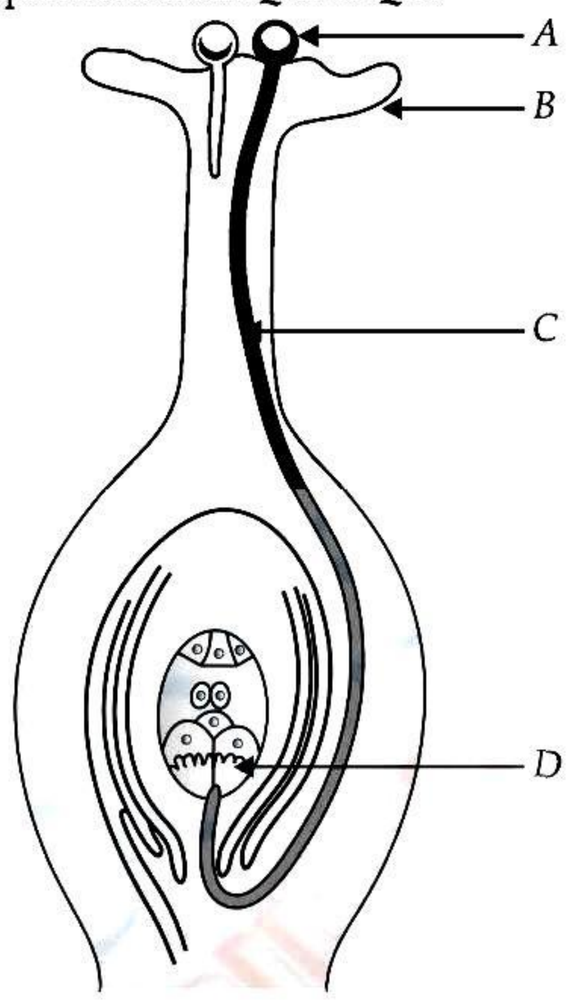
(C) Ovary ripens to form fruit.

(D) Transfer of pollen from anther to stigma of a flower.

Ans. Option (D) is correct.

> ***Explanation:*** Fertilization results in formation of zygote. Zygote divides several times, to form an embryo. The ovule develops a thick coat and is developed into seed. The ovary grows rapidly and ripens to form the fruit.

AI VI. Study the diagram given below and answer any four questions from **Q.1. to Q.5.**



Q. 1. The part labelled as A in the diagram is:

(A) Dust **(B)** Germs

(C) Pollen **(D)** Pollinators

Ans. Option (C) is correct.

> ***Explanation:*** The part labelled as A is pollen/ pollen grain.

Q. 2. Which of the following statement is incorrect about pollination?

(A) It precedes fertilization.

(B) It follows fertilization.

(C) It brings male and female gametes closer.

(D) It introduces variations in plants.

Ans. Option (B) is correct.

> ***Explanation:*** Fertilization which involves fusion of male and female germ cells can only occur only after pollination.

Q. 3. The importance of the part "C" is :

(A) It carries female gametes.

(B) It carries male gametes.

(C) It carries food for the seeds.

(D) None of these

Ans. Option (B) is correct.

> ***Explanation:*** It (pollen tube) carries male gamete to reach egg in embryo sac in ovule

Q. 4. What happens to the part marked 'D' after fertilization is over?

(A) Converted into seed.

(B) Converted into fruit

(C) Converted into embryo

(D) Converted into flower.

Ans. Option (C) is correct.

> ***Explanation:*** The part maked 'D' is ovule. Flowering plants (angiosperms) create embryos after the fertilization of a haploid ovule by pollen. The DNA from the ovule and pollen combine to form a diploid, single-cell zygote that will develop into an embryo.

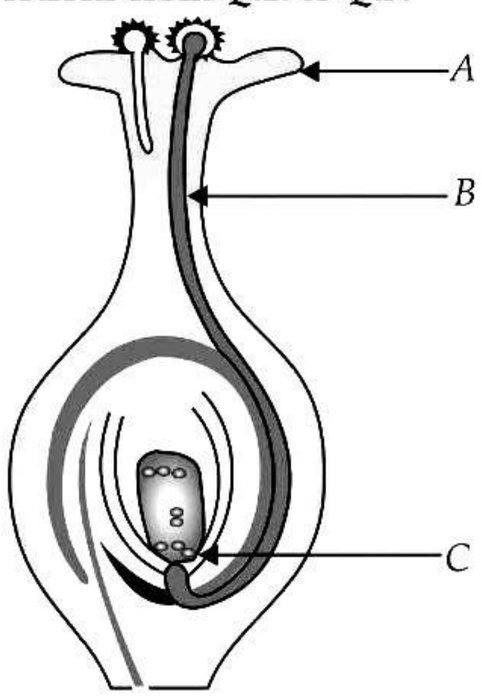
Q. 5. Choose the incorrect statements about the reproductive system of a plant?

(A) The male organs are the stamens.
(B) The anthers produce female gametes.
(C) The male gametes are present in the pollen grains.
(D) A male gamete from a pollen grain fertilize a female gamete in an ovule.

Ans. Option (B) is correct.

> ***Explanation:*** In a flower, the male reproductive parts are anthers which produce the male gametes.

VII. Study the diagram given below and answer any four questions from Q.1. to Q.5.



Q. 1. The part labelled as A is:

(A) Dust **(B)** Germs
(C) Pollen **(D)** Pollinators

Ans. Option (C) is correct.

> ***Explanation:*** The part labelled as A is male germ cells (pollen grain).

Q. 2. The role of part labelled as B is:

(A) Transport of male gametes to the ovary.
(B) Transport of female gametes to the ovary
(C) Contains ovules which develop into seeds.
(D) All of these

Ans. Option (A) is correct.

> ***Explanation:*** Style facilitate the transport of the male gametes to the ovary.

Q. 3. How many male gametes are produced by each pollen grain?

(A) One **(B)** Two
(C) Three **(D)** Four

Ans. Option (B) is correct.

> ***Explanation:*** Each pollen grain produces two male gametes.

Q. 4. What happens to the label A which falls on a suitable stigma?

(A) Pollen grain gradually disintegrates.
(B) Pollen grain directly reaches the embryo sac.
(C) Pollen grain starts germinating and forms a pollen tube.
(D) Pollen grain changes into ovules and then to fruit.

Ans. Option (C) is correct.

> ***Explanation:*** The part labelled A is pollen. The pollen grain starts germinating and forms a pollen tube. The pollen tube grows into the style till it reaches the ovule through micropyle. The pollen tube then reaches the embryo sac into which it releases the two male gametes contained in it. The male gamete then fuses with the female gamete in the embryo sac.

Q. 5. In the given diagram showing the carpel of an insect pollinated flower, the most likely reason for the non-germination of pollen grain Z is :

(A) Pollen grains X and V were brought to the stigma earlier, therefore, their germination inhibited the germination of pollen grain Z.
(B) Pollen grain Z was brought to the flower by wind, while pollen grains X and Y were brought to the flower by insects.
(C) Pollen grain Z lacks protrusions that allow it to adhere properly onto the stigma surface.
(D) Pollen grain Z comes from a flower of an incompatible species.

Ans. Option (D) is correct.

> ***Explanation:*** Pollen grains can only germinate if the pollen grain and stigma are compatible, *i.e.*, of the same or closely related species. Pollen grains X and Y must have come from a compatible species. Only compatible pollen grains germinate and form pollen tubes

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