Multiple Choice Questions

1. A researcher set up three culture plates (P, Q, and R) to study asexual reproduction in different organisms under identical environmental conditions:

Plate P: Amoeba placed in a nutrient-rich medium.

Plate Q: Plasmodium inside a host cell capsule under stressful conditions.

Plate R: Spirogyra placed in a beaker of stagnant water with a small mechanical agitator stirring the water gently.

Predict the primary mode of reproduction observed in each plate:

A) P = Binary fission, Q = Multiple fission, R = Fragmentation

B) P = Budding, Q = Binary fission, R = Regeneration

C) P = Multiple fission, Q = Binary fission, R = Spore formation

D) P = Binary fission, Q = Spore formation, R = Budding

2. Both Planaria and Hydra can undergo regeneration. However, if a Hydra is cut into tiny pieces where some pieces completely lack the specialized epidermal/interstitial cell layer, those specific pieces fail to regenerate into whole organisms. What does this demonstrate?

A) Regeneration is a non-specific process occurring in any dead or living tissue

B) Regeneration depends strictly on the presence of specific stem-like, proliferation-capable cells

C) Cell division in Hydra requires external gametes

D) Hydra reproduces exclusively via sexual methods when injured

3. Two plants of the same species were grown under controlled conditions:

Plant A: Raised from seeds produced by double fertilization.

Plant B: Raised from stem cuttings via vegetative propagation.

Which of the following observations is most scientifically accurate regarding these two plants?

A) Plant B will show higher genetic variability than Plant A

B) Plant A will reach the flowering and fruiting stage earlier than Plant B

C) Plant B will flower earlier and produce genetically uniform offspring identical to its parent

D) Plant A cannot produce functional seeds in its lifetime

4. In an experiment, a student removed the sporangia-bearing structures (sporangiophores) from a colony of Rhizopus before they matured and turned black. What will be the immediate impact on the colony's propagation?

A) The vegetative hyphae will immediately die due to lack of nutrition

B) The fungus will fail to disperse airborne asexual spores to colonize new substrates

C) The fungus will switch to binary fission

D) The hyphae will convert into floral structures

5. Consider the following statements regarding binary fission in Leishmania:

It occurs strictly along a definite plane relative to its whip-like flagellum.

It produces four daughter cells simultaneously.

The division of the nucleus precedes the division of the cytoplasm.

Which of the statements given above are correct?

A) 1 and 2 only

B) 1 and 3 only

C) 2 and 3 only

D) 1, 2, and 3

6. A potted Bryophyllum plant has healthy leaves attached to its stem. A detached leaf from the same plant is left on moist soil in a dark enclosure. What will be observed after 10 days?

A) Bud formation occurs only on the attached leaves because they receive sunlight

B) Adventitious buds along the notches of the detached leaf will germinate into plantlets using stored nutrients

C) The detached leaf undergoes double fertilization on the soil

D) The leaf converts into sporangia to release spores

7. If the chromosome number in a root tip cell of a mustard plant is 2n = 18, what will be the chromosome number in its pollen grain nucleus, egg cell, and endosperm nucleus, respectively?

A) 18, 18, 36

B) 9, 9, 27

C) 9, 18, 27

D) 18, 9, 18

8. In a laboratory setup, a student bagged an unopened flower of a unisexual female papaya plant without dusting any pollen on its stigma. What will be the expected outcome after several weeks?

A) Normal fruit with viable seeds will form

B) Seedless fruit will develop automatically via syngamy

C) No seed or fruit will form, and the flower will eventually wither and drop

D) The flower will convert into a male flower

9. Why is the growth of a pollen tube down the style toward the ovule classified as a chemotropic movement?

A) The pollen tube grows in response to direct sunlight hitting the stigma

B) The pollen tube responds to chemical substances secreted by the stigma, style, and ovule

C) The pollen tube grows against gravity toward the roots

D) Water pressure inside the style pushes the tube downward mechanically

10. A plant breeder wants to produce a hybrid plant by crossing Variety A (pollen donor) and Variety B (female parent). Which sequence of steps must be carried out on Variety B's bisexual flower?

A) Bagging- Emasculation -Dusting pollen from A - Re-bagging

B) Emasculation - Bagging - Dusting pollen from A - Re-bagging

C) Dusting pollen from A - Emasculation - Bagging

D) Emasculation - Re-bagging - Triple fusion -Germination

11. A flower has long, feathery stigmas hanging outside its petals and light, smooth, non-sticky pollen grains produced in huge quantities. What is the most likely mode of pollination for this plant?

A) Insect pollination (Entomophily)

B) Water pollination (Hydrophily)

C) Wind pollination (Anemophily)

D) Bird pollination (Ornithophily)

12. During an experiment, the style of a flower was surgically shortened by half before a pollen tube could traverse it. If a compatible pollen grain germinates on the cut surface:

A) The pollen tube will stop growing because it detects the missing length

B) The pollen tube can still grow through the remaining style length and reach the ovule if chemical cues remain intact

C) The egg cell will instantly divide without fertilization

D) The ovary will turn into a leaf

13. Statement 1: Offspring produced by asexual reproduction show very little evolutionary variation.

Statement 2: Asexual reproduction involves DNA copying mechanisms with extremely minor biochemical inaccuracies, lacking the combination of two distinct genomes.

Choose the correct option:

A) Both Statement 1 and Statement 2 are true, and Statement 2 is the correct explanation for Statement 1.

B) Both Statement 1 and Statement 2 are true, but Statement 2 is NOT the correct explanation for Statement 1.

C) Statement 1 is true, but Statement 2 is false.

D) Statement 1 is false, but Statement 2 is true.

14. Which of the following events takes place first after a pollen grain lands on a compatible stigma?

A) Fusion of the male gamete with the polar nuclei

B) Hydration of the pollen grain by stigmatic secretions triggering pollen tube emergence

C) Entry of the pollen tube through the micropyle of the ovule

D) Division of the zygote into an embryo

15. How does self-pollination differ fundamentally from vegetative propagation, even though both involve a single parent plant in many cases?

A) Self-pollination involves meiotic division and gamete fusion, creating minor genetic variations, whereas vegetative propagation involves purely mitotic division

B) Self-pollination produces exact clones, while vegetative propagation creates high genetic diversity

C) Self-pollination requires no flowers or seeds, while vegetative propagation always produces seeds

D) Vegetative propagation depends on double fertilization, while self-pollination does not

16. A botanist cuts open a mature fruit and finds 42 fully formed, viable seeds inside. What is the minimum number of pollen grains and male gametes that participated in forming these seeds?

A) 42 pollen grains and 42 male gametes

B) 42 pollen grains and 84 male gametes

C) 21 pollen grains and 42 male gametes

D) 84 pollen grains and 84 male gametes

17. Why do tissue culture techniques require strictly sterile conditions during the propagation stage?

A) Because plant hormones decompose in the presence of light

B) Because nutrient agar media support rapid growth of bacterial and fungal contaminants that outcompete the delicate plant tissue

C) To prevent the plant tissue from undergoing photosynthesis

D) To force the cells to undergo meiosis instead of mitosis

18. A student observed a slice of bread kept in a warm, moist place for three days and noticed fine thread-like structures with tiny black blobs at their tips. Which statement correctly identifies these structures and their function?

A) The threads are sporangia, and the black blobs are hyphae that absorb nutrients

B) The threads are hyphae, and the black blobs are sporangia containing reproductive spores

C) The threads are roots, and the black blobs are seeds ready for germination

D) The threads are pollen tubes, and the black blobs are male gametes

19. In angiosperms, double fertilization is a characteristic process. What are the two specific fusion events that constitute double fertilization?

A) Fusion of one male gamete with the egg cell, and fusion of pollen tube with the style

B) Fusion of two male gametes with a single egg cell

C) Fusion of one male gamete with the egg cell (Syngamy), and fusion of the second male gamete with two polar nuclei (Triple Fusion)

D) Fusion of pollen grain with the stigma, and fusion of ovule with the ovary wall

20. During an experiment, all the stamens were removed from an unopened bisexual flower before pollen release, and the flower was left uncovered. What is the most likely outcome regarding fruit formation?

A) The flower will wither immediately and cannot produce a fruit

B) The flower can still form a fruit with seeds if cross-pollination occurs via wind or insects

C) The flower will automatically produce a seedless fruit without pollination

D) The flower will turn into a male flower