

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2019

There are 25 questions, and each question carries two marks.

1. A student claims: "Consuming caffeine improves memory in teenagers." Which is the best null hypothesis?
A) Teenagers who consume caffeine will have higher memory scores.
B) Teenagers who consume caffeine will not show any difference in memory scores compared to those who don't.
C) Teenagers dislike caffeine.
D) Caffeine makes no difference to brain activity in adults.
2. In eukaryotic cells, ribosomes can be found:
A) Only in the cytoplasm
B) On the RER and freely in the cytoplasm
C) Only in the mitochondria
D) Only inside the nucleus
3. In the light-dependent reactions of photosynthesis, the main function of water is to:
A) Provide carbon for glucose synthesis
B) Donate electrons to photosystem II
C) Directly form ATP
D) Absorb photons
4. DNA replication is described as semi-conservative because:
A) Each new DNA molecule has two completely new strands.
B) One original strand is conserved in each new molecule.
C) Both original strands remain together in one molecule.
D) Only one strand of DNA is copied.
5. A gene is "expressed" when:
A) It is present in the DNA sequence
B) Its product (RNA or protein) is synthesized and functional
C) Its promoter region is inactive
D) Its codons are deleted
6. If a red flower (RR) is crossed with a white flower (rr) and all offspring are pink (Rr), this is an example of:
A) Codominance
B) Incomplete dominance
C) Polygenic inheritance
D) Epistasis

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7. Which feature distinguishes eukaryotic gene regulation from prokaryotic gene regulation?
 - A) Use of operons
 - B) RNA splicing and intron removal**
 - C) Polycistronic mRNA
 - D) Direct coupling of transcription and translation
8. Which type of environmental factor has been shown to directly affect epigenetic marks?
 - A) Diet and nutrition
 - B) Stress and trauma
 - C) Exposure to toxins
 - D) All of the above**
9. Cloning an animal by somatic cell nuclear transfer (SCNT) involves:
 - A) Replacing the nucleus of an egg cell with a somatic cell nucleus**
 - B) Injecting mRNA into a zygote
 - C) Combining two sperm cells
 - D) Using CRISPR to modify DNA
10. Bt crops are genetically engineered to:
 - A) Tolerate drought conditions
 - B) Produce a bacterial toxin that kills specific insect pests**
 - C) Increase vitamin content
 - D) Enhance photosynthetic efficiency
11. Which statement about red blood cells is correct?
 - A) They have nuclei and mitochondria
 - B) They transport oxygen bound to hemoglobin**
 - C) They produce antibodies
 - D) They are primarily involved in blood clotting
12. In adaptive immunity, humoral immunity is mediated by:
 - A) T-helper cells
 - B) B lymphocytes producing antibodies**
 - C) Cytotoxic T cells
 - D) Natural killer (NK) cells
13. Which is a common preventive measure against waterborne infectious diseases?
 - A) Handwashing only
 - B) Vaccination
 - C) Boiling or chlorinating drinking water**
 - D) Using antibiotics prophylactically

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14. The blood-brain barrier (BBB) functions to:
- A) Facilitate rapid nerve impulse transmission
 - B) Protect the brain from toxins and pathogens**
 - C) Produce cerebrospinal fluid
 - D) Maintain reflex arcs
15. Which type of adaptation is structural?
- A) Thick fur in arctic animals**
 - B) Hibernation in bears
 - C) Producing venom in snakes
 - D) Behavioral migration patterns
16. Analogous structures are:
- A) Similar in function but not in evolutionary origin**
 - B) Similar in origin but not in function
 - C) Found only in extinct species
 - D) Identical at molecular and functional levels
17. Which of the following is an example of mutualism?
- A) Clownfish and sea anemone**
 - B) Lion and zebra
 - C) Tapeworm and human
 - D) Barnacle on whale
18. Acid rain results from:
- A) Excess CO₂ dissolving in water
 - B) NO_x and SO_x emissions reacting with water in the atmosphere**
 - C) Chlorofluorocarbons in the ozone layer
 - D) Methane emissions
19. Which fungal structure is primarily responsible for reproduction?
- A) Mycelium
 - B) Hyphae
 - C) Spore**
 - D) Chitin cell wall
20. Horizontal gene transfer in bacteria includes:
- A) Binary fission only
 - B) Conjugation, transformation, and transduction**
 - C) Mitosis
 - D) Spore formation
21. Dysbiosis refers to:
- A) A healthy microbial balance
 - B) Imbalance in microbial communities leading to disease**

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- C) Extinction of microbes
- D) Horizontal gene transfer

22. Which particle has negligible mass but a negative charge?

- A) Proton
- B) Neutron
- C) Electron**
- D) Positron

23. Hund's rule states that:

- A) Electrons fill degenerate orbitals singly before pairing**
- B) Orbitals fill from highest to lowest energy
- C) No two electrons can have the same set of quantum numbers
- D) Electrons always pair first

24. Which compound contains covalent bonds only?

- A) CO₂**
- B) NaCl
- C) MgO
- D) KBr

25. Which shape corresponds to AX₅E₀ in VSEPR notation?

- A) Trigonal bipyramidal**
- B) Square planar
- C) Octahedral
- D) T-shaped