

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2021

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

- 1. A researcher wants to test the effect of fertilizer type on plant growth. Which setup best ensures valid results?**
A) Different plants, different soils, different fertilizers
B) Same plant species, same soil, varying fertilizer types
C) Same plant species, same fertilizer, different amounts of water
D) Different fertilizers, different sunlight exposure
- 2. Which organelle is responsible for producing ATP through oxidative phosphorylation?**
A) Golgi apparatus
B) Endoplasmic reticulum
C) Mitochondrion
D) Ribosome
- 3. Which stage of aerobic respiration produces the most ATP?**
A) Glycolysis
B) Link reaction
C) Krebs cycle
D) Electron transport chain (ETC)
- 4. Which of the following correctly describes base pairing in DNA?**
A) Adenine–Cytosine; Guanine–Thymine
B) Adenine–Thymine; Guanine–Cytosine
C) Adenine–Guanine; Cytosine–Thymine
D) Adenine–Uracil; Guanine–Cytosine
- 5. In eukaryotic cells, which process occurs in the nucleus before translation?**
A) Splicing of pre-mRNA to remove introns
B) Assembly of ribosomal subunits
C) Binding of tRNA to codons
D) Folding of polypeptides into tertiary structure
- 6. In a monohybrid cross between two heterozygotes ($Aa \times Aa$), what is the expected genotypic ratio?**
A) 1:1
B) 3:1
C) 1:2:1
D) 2:1:1

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7. In the lac operon, the role of the repressor protein is to:
- A) Enhance transcription
 - B) Block RNA polymerase from binding to the promoter
 - C) Produce β -galactosidase
 - D) Bind directly to glucose molecules
8. DNA methylation usually occurs on which base in eukaryotic DNA?
- A) Adenine
 - B) Cytosine
 - C) Guanine
 - D) Thymine
9. Which component of CRISPR-Cas9 guides the Cas9 enzyme to the target DNA sequence?
- A) PAM sequence
 - B) Guide RNA (gRNA)
 - C) DNA polymerase
 - D) Ligase
10. Which biotechnology technique is commonly used for diagnosing genetic disorders?
- A) PCR (Polymerase Chain Reaction)
 - B) CRISPR-Cas9
 - C) Gel electrophoresis
 - D) DNA sequencing
11. In the circulatory system, the systemic circuit:
- A) Carries deoxygenated blood to the lungs
 - B) Delivers oxygenated blood from the heart to the rest of the body
 - C) Pumps blood to the liver only
 - D) Bypasses the heart entirely
12. Which immune cells are primarily responsible for phagocytosis?
- A) T-helper cells
 - B) B cells
 - C) Macrophages and neutrophils
 - D) Plasma cells
13. Non-infectious diseases are primarily caused by:
- A) Bacteria and viruses
 - B) Genetic defects, lifestyle, or environmental factors
 - C) Protozoa
 - D) Fungi

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14. The cerebral cortex is mainly involved in:
- A) Reflex actions
 - B) Higher-order functions like thinking, memory, and decision-making**
 - C) Controlling heart rate
 - D) Producing cerebrospinal fluid
15. Which statement exemplifies directional selection?
- A) Average-sized seeds in a plant population are favored over very large or small seeds
 - B) Extremely long necks in giraffes are selected for**
 - C) Both extremes of beak size are favored
 - D) There is no change in trait distribution
16. Fossils provide evidence of:
- A) Past life forms and evolutionary transitions**
 - B) DNA mutations in living humans only
 - C) Only extinct marine organisms
 - D) Artificial selection
17. Which term refers to the variety of genes, species, and ecosystems in a region?
- A) Ecosystem stability
 - B) Biodiversity**
 - C) Biomagnification
 - D) Trophic cascade
18. Deforestation contributes to climate change because:
- A) Trees release CO₂ when they grow
 - B) It reduces carbon sequestration and increases greenhouse gas concentration**
 - C) It increases oxygen production
 - D) Soil moisture increases
19. Which feature distinguishes viruses from living cells?
- A) Presence of DNA or RNA
 - B) Ability to reproduce only inside a host cell**
 - C) Protein coat
 - D) Ability to mutate
20. Misuse of antibiotics in humans contributes to resistance because:
- A) It kills all bacteria in the body
 - B) It selects for bacteria that carry resistance genes**
 - C) It reduces immunity
 - D) It prevents viral infections

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21. Which term describes microorganisms living in or on a host without causing disease?
- A) Pathogens
 - B) Commensals**
 - C) Parasites
 - D) Toxins
22. The mass number of an atom is the sum of:
- A) Protons + Electrons
 - B) Neutrons + Electrons
 - C) Protons + Neutrons**
 - D) Electrons + Photons
23. Which principle states that electrons fill the lowest energy orbitals first?
- A) Pauli exclusion principle
 - B) Aufbau principle**
 - C) Hund's rule
 - D) Heisenberg uncertainty principle
24. In a covalent bond, atoms share electrons to achieve:
- A) Ionic stability
 - B) Noble gas configuration**
 - C) Metallic bonding
 - D) Radioactive decay
25. Which molecule has a bent shape due to lone pairs on the central atom?
- A) CO_2
 - B) H_2O**
 - C) BeCl_2
 - D) BF_3