

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2017

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

- 1. A graph shows an exponential rise in bacterial growth but later levels off. Which explanation is most valid?**
 - A) Measurement error in late stages
 - B) Bacteria stop reproducing due to reaching carrying capacity**
 - C) The microscope resolution decreased
 - D) The graph is inaccurate
- 2. Which feature is unique to mitochondria and chloroplasts among organelles?**
 - A) Presence of DNA and ribosomes enabling semi-autonomy**
 - B) Ability to store waste products
 - C) Packaging of proteins for export
 - D) Involvement in lipid synthesis
- 3. Why is the Krebs cycle often referred to as a “metabolic hub”?**
 - A) It occurs only in plants.
 - B) Many metabolic pathways feed into or branch out of it.**
 - C) It produces oxygen directly.
 - D) It occurs in the cytoplasm.
- 4. What role does DNA ligase play in replication?**
 - A) Initiates synthesis of the leading strand
 - B) Seals gaps between Okazaki fragments on the lagging strand**
 - C) Adds RNA primers
 - D) Proofreads newly synthesized DNA
- 5. In the lac operon of *E. coli*, what happens when lactose is present but glucose is absent?**
 - A) The operon remains repressed.
 - B) RNA polymerase binds strongly, and transcription of lactose-metabolizing genes occurs.**
 - C) Transcription stops completely.
 - D) Ribosomes degrade the mRNA.
- 6. A man with blood group type A (genotype AO) marries a woman with blood group type B (genotype BO). What blood group(s) could their children potentially have?**
 - A) Only AB
 - B) Only O**
 - C) A, B, AB, or O
 - D) Only A and B
- 7. Histone acetylation typically:**
 - A) Condenses chromatin and silences genes

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- B) Relaxes chromatin and activates genes**
 - C) Removes nucleotides from mRNA
 - D) Blocks ribosome assembly
8. Which example best illustrates transgenerational epigenetic inheritance?
- A) A DNA mutation passed from parent to child
 - B) A stress-induced DNA methylation pattern inherited by offspring**
 - C) A protein modification within a single cell's lifetime
 - D) A ribosomal mutation affecting translation
9. A GMO plant with a bacterial gene that produces a toxin to pests is an example of:
- A) Cisgenesis
 - B) Transgenesis**
 - C) Gene silencing
 - D) Epigenetic modification
10. Monoclonal antibodies are used in medicine for:
- A) Targeted drug delivery and immunotherapy**
 - B) Increasing crop yield
 - C) DNA replication in vitro
 - D) Cloning livestock
11. Which part of the nervous system controls involuntary actions such as heartbeat and digestion?
- A) Somatic nervous system
 - B) Autonomic nervous system**
 - C) Central nervous system
 - D) Peripheral sensory nerves
12. Which immunoglobulin is the first antibody produced in response to a primary infection?
- A) IgG
 - B) IgA
 - C) IgM**
 - D) IgE
13. Which of the following is an example of a chronic non-infectious disease?
- A) Tuberculosis
 - B) Asthma**
 - C) Measles
 - D) Influenza
14. In a typical neuron, the axon hillock is responsible for:
- A) Receiving signals from other neurons**
 - B) Initiating the action potential**

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- C) Storing neurotransmitters
- D) Synthesizing proteins

15. Which process leads to the formation of new species?

- A) Genetic drift
- B) Speciation**
- C) Mutation
- D) Gene flow

16. Vestigial structures, like the human appendix, indicate:

- A) Features with no current function but evidence of ancestral traits**
- B) Highly adaptive organs
- C) Structures formed only by mutation
- D) Newly evolved features

17. Ecological succession refers to:

- A) Seasonal migration of animals
- B) Gradual change in species composition of a community over time**
- C) Predator-prey cycles
- D) Random extinction events

18. Ozone depletion in the stratosphere is mainly caused by:

- A) CO₂ emissions
- B) Chlorofluorocarbons (CFCs)**
- C) Nitrogen oxides from lightning
- D) Methane from agriculture

19. Which virus replication strategy involves integration of viral DNA into the host genome?

- A) Lytic cycle
- B) Lysogenic cycle**
- C) Binary fission
- D) Budding

20. Overuse of antibiotics in agriculture can lead to:

- A) Development of resistant bacterial strains in animals**
- B) Increased crop yield
- C) Elimination of pathogens in soil
- D) Sterilization of water

21. The term microbiome includes:

- A) Only bacteria in an ecosystem
- B) All microorganisms (bacteria, fungi, viruses, archaea, protists) in a specific environment**
- C) Only pathogenic microorganisms
- D) Only fungi and protists

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22. The nucleus of an atom contains:

- A) Protons and neutrons**
- B) Electrons only
- C) Protons and electrons
- D) Neutrons and electrons

23. Which factor primarily causes decreasing atomic radius across a period?

- A) Increasing number of electron shells
- B) Increasing effective nuclear charge**
- C) Increasing number of neutrons only
- D) Increasing metallic character

24. Which of the following is a giant metallic lattice?

- A) Sodium (Na)**
- B) Methane (CH₄)
- C) Diamond
- D) Water (H₂O)

25. Which factor causes deviation from ideal bond angles in VSEPR theory?

- A) Lone pair-lone pair, lone pair-bonding pair, and bonding pair-bonding pair repulsion differences**
- B) Atomic mass
- C) Number of neutrons
- D) Ionic charge

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