

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2022

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

- 1. A hypothesis states: “Increased light intensity improves the rate of photosynthesis until a saturation point.”**
Which element makes this a strong scientific hypothesis?

 - A) It suggests light is always beneficial.
 - B) It predicts both a trend and a limiting factor.**
 - C) It cannot be disproven.
 - D) It ignores measurable variables.
- 2. Which statement correctly differentiates prokaryotic and eukaryotic cells?**

 - A) Only prokaryotic cells contain ribosomes.
 - B) Eukaryotic cells have membrane-bound organelles, while prokaryotic cells do not.**
 - C) Prokaryotic cells contain mitochondria, but eukaryotic cells lack them.
 - D) Both prokaryotic and eukaryotic cells have nuclei.
- 3. During glycolysis, one molecule of glucose ($C_6H_{12}O_6$) is converted into:**

 - A) 2 molecules of acetyl-CoA
 - B) 2 molecules of pyruvate**
 - C) 4 molecules of pyruvate
 - D) 6 molecules of carbon dioxide
- 4. Which bond holds the complementary base pairs together in the DNA double helix?**

 - A) Ionic bonds
 - B) Covalent bonds
 - C) Hydrogen bonds**
 - D) Peptide bonds
- 5. Which of the following correctly describes the central dogma of molecular biology?**

 - A) DNA → Protein → RNA
 - B) Protein → DNA → RNA
 - C) DNA → RNA → Protein**
 - D) RNA → Protein → DNA
- 6. According to Mendel’s law of segregation, what happens during gamete formation?**

 - A) Each gamete receives both alleles of a gene.
 - B) Each gamete receives only one allele of a gene.**

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- C) Alleles always blend to form intermediate traits.
D) Dominant alleles are always passed on.
7. **In prokaryotes, the cluster of genes under the control of a single promoter is called:**
A) **Operon**
B) Enhancer
C) Silencer
D) Plasmid
8. **Which best defines epigenetics?**
A) Permanent changes in DNA base sequence
B) **Heritable changes in gene expression without altering DNA sequence**
C) Random mutations caused by environmental stress
D) Chromosomal rearrangements passed to offspring
9. **CRISPR-Cas9 is primarily used for:**
A) Measuring protein levels
B) **Editing specific DNA sequences**
C) Cloning entire organisms
D) Sequencing RNA molecules
10. **Which of the following is a medical application of recombinant DNA technology?**
A) **Producing human insulin in bacteria**
B) Developing pest-resistant crops
C) Soil bioremediation
D) Cloning animals for agriculture
11. **Which of the following enzymes is secreted in an inactive form and activated only in the small intestine?**
A) Salivary amylase
B) Pepsinogen → Pepsin
C) **Pancreatic trypsinogen → Trypsin**
D) Lactase
12. **Which of the following is a first line of defense in innate immunity?**
A) T lymphocytes
B) **Skin and mucous membranes**
C) Antibodies
D) B lymphocytes
13. **Which of the following is an example of an infectious disease?**
A) Diabetes
B) **Tuberculosis**

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- C) Hypertension
- D) Sickle cell anemia

14. Which part of the brain is primarily responsible for coordination and balance?

- A) Cerebrum
- B) Cerebellum**
- C) Medulla oblongata
- D) Hypothalamus

15. Which of the following best describes natural selection?

- A) Organisms develop traits intentionally to adapt
- B) Individuals with advantageous traits survive and reproduce more successfully**
- C) Evolution occurs within a single organism's lifetime
- D) Mutations always produce harmful effects

16. Which type of fossil preserves the entire organism in ice, amber, or tar?

- A) Trace fossil
- B) Mold fossil
- C) Cast fossil
- D) True form fossil**

17. In an ecosystem, which of the following represents a primary consumer?

- A) Grass
- B) Rabbit**
- C) Lion
- D) Decomposer

18. Which type of pollution is primarily responsible for eutrophication in aquatic ecosystems?

- A) Air pollution from vehicles
- B) Nutrient runoff containing nitrogen and phosphorus**
- C) Thermal pollution
- D) Noise pollution

19. Which of the following is prokaryotic?

- A) Amoeba
- B) Bacterium**
- C) Virus
- D) Yeast

20. Which mechanism allows bacteria to resist the effects of antibiotics?

- A) Altering target sites
- B) Producing enzymes that inactivate antibiotics
- C) Efflux pumps to remove antibiotics
- D) All of the above**

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21. The human gut microbiome primarily contributes to:
- A) Protein synthesis in the liver
 - B) Digestion, vitamin production, and immune modulation**
 - C) Oxygen transport
 - D) Neural signal transmission
22. Which subatomic particle determines the atomic number of an element?
- A) Proton**
 - B) Neutron
 - C) Electron
 - D) Photon
23. Which of the following is the correct electron configuration for neutral sulfur (atomic number 16)?
- A) $1s^2 2s^2 2p^6 3s^2 3p^4$**
 - B) $1s^2 2s^2 2p^6 3s^2 3p^2$
 - C) $1s^2 2s^2 2p^6 3s^2 3p^6$
 - D) $1s^2 2s^2 2p^4 3s^2 3p^4$
24. Which of the following is an example of ionic bonding?
- A) NaCl**
 - B) O₂
 - C) H₂O
 - D) Fe
25. According to VSEPR theory, the shape of CH₄ is:
- A) Linear
 - B) Tetrahedral**
 - C) Trigonal planar
 - D) Bent