

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2020

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

- 1. The bond angle in trigonal planar molecules is approximately:**
A) 90°
B) 109.5°
C) 120°
D) 180°
- 2. Why are control variables essential in experimental design?**
A) They reduce the number of trials needed
B) They eliminate the need for replication
C) They isolate the effect of the independent variable
D) They guarantee the hypothesis will be correct
- 3. Which best explains why the rough endoplasmic reticulum (RER) appears “rough” under an electron microscope?**
A) **It has ribosomes attached to its cytoplasmic surface.**
B) It is studded with DNA fragments.
C) It contains pores in its membrane.
D) It has vesicles budding from its surface.
- 4. Which compound acts as the final electron acceptor in aerobic respiration?**
A) NAD^+
B) Oxygen
C) Carbon dioxide
D) ATP
- 5. Which enzyme is responsible for “unzipping” DNA during replication by breaking hydrogen bonds?**
A) DNA polymerase
B) DNA helicase
C) DNA ligase
D) RNA polymerase
- 6. Which structure is responsible for peptide bond formation during translation?**
A) DNA polymerase
B) Ribosomal RNA (rRNA) within the ribosome
C) Transfer RNA (tRNA)
D) RNA polymerase

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7. In a dihybrid cross between two heterozygotes ($AaBb \times AaBb$), the expected phenotypic ratio under independent assortment is:
- A) 1:1
 - B) 9:3:3:1**
 - C) 1:2:1
 - D) 3:1
8. In the lac operon, lactose functions as:
- A) Corepressor
 - B) Inducer**
 - C) Enhancer
 - D) Repressor
9. Increased methylation of promoter regions in DNA most often results in:
- A) Enhanced gene transcription
 - B) Reduced gene expression**
 - C) DNA replication errors
 - D) Production of alternative proteins
10. In CRISPR-mediated genome editing, what is the function of Cas9?
- A) To synthesize RNA
 - B) To cut the target DNA at a specific site**
 - C) To insert plasmids into cells
 - D) To replicate the DNA
11. Which of the following describes gene therapy?
- A) Using bacteria to produce hormones
 - B) Introducing functional genes to replace defective ones in patients**
 - C) Cloning animals for organ transplants
 - D) Altering soil microbes to increase crop yield
12. Which structure prevents food from entering the trachea during swallowing?
- A) Epiglottis**
 - B) Pharynx
 - C) Larynx
 - D) Uvula
13. Which component of innate immunity involves complement proteins?
- A) Direct killing of pathogens and enhancing phagocytosis**
 - B) Production of antigen-specific antibodies
 - C) Activation of memory B cells
 - D) T cell receptor recognition

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14. Which of the following is transmitted by vector-borne transmission?
- A) Influenza
 - B) Malaria**
 - C) Cholera
 - D) Measles
15. Which of the following neurotransmitters is primarily excitatory in the central nervous system?
- A) GABA
 - B) Glutamate**
 - C) Dopamine
 - D) Serotonin
16. Stabilizing selection tends to:
- A) Favor intermediate phenotypes and reduce variation**
 - B) Favor extreme phenotypes
 - C) Eliminate the mean phenotype
 - D) Produce entirely new species instantly
17. Which of the following is an example of homologous structures?
- A) Human arm and bat wing**
 - B) Bat wing and insect wing
 - C) Shark fin and dolphin fin
 - D) Butterfly wing and bird wing
18. Keystone species are important because:
- A) They are the most abundant species
 - B) Their removal can dramatically alter ecosystem structure**
 - C) They have no predators
 - D) They always occupy the top trophic level
19. Which gas is considered the most significant contributor to anthropogenic global warming?
- A) Oxygen (O₂)
 - B) Carbon dioxide (CO₂)**
 - C) Nitrogen (N₂)
 - D) Helium (He)
20. Which type of bacteria can survive in oxygen-free environments?
- A) Obligate aerobes
 - B) Obligate anaerobes**
 - C) Facultative aerobes
 - D) Photoautotrophs

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21. Which of the following is a public health consequence of widespread antibiotic resistance?
- A) Increased severity and duration of infections
 - B) Higher healthcare costs
 - C) Limited treatment options
 - D) All of the above
22. Which of the following is an example of mutualism in microbial ecology?
- A) Nitrogen-fixing bacteria in plant roots
 - B) Pathogenic bacteria causing disease
 - C) Viruses infecting humans
 - D) Antibiotic-resistant bacteria
23. An atom with 6 protons, 6 neutrons, and 6 electrons is:
- A) Carbon-12
 - B) Oxygen-16
 - C) Carbon-14
 - D) Nitrogen-14
24. Which element has the electron configuration $[\text{Ne}] 3s^2 3p^5$?
- A) Chlorine
 - B) Sulfur
 - C) Phosphorus
 - D) Argon
25. Which property is characteristic of metallic bonding?
- A) High melting and boiling points, malleability, and electrical conductivity
 - B) Low melting point and solubility in water
 - C) Brittle solids and poor conductivity
 - D) Formation of discrete molecules only