

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2012

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

1. A student concludes: "This experiment proves the hypothesis is correct." Why is this statement scientifically flawed?
A) Experiments can only support, not prove, a hypothesis.
B) The student should have included a control variable.
C) The conclusion should be based on opinion.
D) A single trial is always enough.
2. The charge of a proton is:
A) 0
B) +1
C) -1
D) +2
3. Which trend increases down a group?
A) Electronegativity
B) Atomic radius
C) Ionization energy
D) Non-metallic character
4. Which of the following molecules contains a polar covalent bond?
A) H₂
B) HF
C) Cl₂
D) O₂
5. The VSEPR formula AX₃E₁ corresponds to which molecular shape?
A) Trigonal pyramidal
B) Trigonal planar
C) T-shaped
D) Bent
6. Which organelle is involved in detoxifying harmful metabolic by-products, such as hydrogen peroxide?
A) Golgi apparatus
B) Peroxisome
C) Lysosome
D) Vacuole

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7. **The light-independent reactions of photosynthesis occur in the:**
 - A) Stroma of the chloroplast**
 - B) Thylakoid membranes
 - C) Cytoplasm
 - D) Cristae of mitochondria
8. **Which of the following best explains the “degeneracy” of the genetic code?**
 - A) Each codon codes for more than one amino acid.
 - B) More than one codon can specify the same amino acid.**
 - C) Some amino acids are not coded by any codon.
 - D) Codons overlap in reading frames.
9. **Which step of protein synthesis requires GTP as an energy source?**
 - A) Amino acid activation by aminoacyl-tRNA synthetase
 - B) Peptide bond formation
 - C) Ribosome translocation along mRNA**
 - D) DNA unwinding during replication
10. **A test cross is performed to determine the genotype of an individual with a dominant phenotype. The test cross involves:**
 - A) Crossing with another dominant individual
 - B) Crossing with a homozygous recessive individual**
 - C) Crossing with a heterozygote
 - D) Self-fertilization
11. **Which molecule acts as a transcription factor in eukaryotic gene regulation?**
 - A) RNA polymerase
 - B) Protein that binds DNA regulatory sequences**
 - C) tRNA carrying amino acids
 - D) Ribosomal RNA
12. **Which epigenetic modification is often associated with cancer development?**
 - A) Global hypomethylation of DNA
 - B) Increased methylation of tumor suppressor genes
 - C) Histone deacetylation
 - D) All of the above**
13. **Which technique allows scientists to create knockout organisms to study gene function?**
 - A) CRISPR-Cas9**
 - B) RNA splicing
 - C) Somatic cell nuclear transfer
 - D) Gel electrophoresis

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14. **Vaccines produced using recombinant DNA technology include:**
A) Polio and tuberculosis vaccines
B) Hepatitis B vaccine and HPV vaccine
C) Antibiotics
D) Beta-carotene supplements
15. **During the menstrual cycle, ovulation is triggered primarily by:**
A) FSH (Follicle Stimulating Hormone)
B) LH (Luteinizing Hormone) surge
C) Progesterone decrease
D) Estrogen inhibition
16. **Which cytokines are critical for activating cytotoxic T cells?**
A) Interleukins and interferons
B) Insulin and glucagon
C) Thyroxine and cortisol
D) Histamines and prostaglandins
17. **Which strategy is most effective in controlling vector-borne diseases?**
A) Boiling water
B) Using insecticides and mosquito nets
C) Vaccination only
D) Isolating patients
18. **Parkinson's disease primarily results from:**
A) Loss of dopaminergic neurons in the substantia nigra
B) Beta-amyloid accumulation in the hippocampus
C) Autoimmune destruction of neurons
D) Excess acetylcholine in motor neurons
19. **Which evolutionary mechanism can cause rapid changes in small populations by random events?**
A) Gene flow
B) Genetic drift
C) Natural selection
D) Speciation
20. **Which of the following best describes comparative embryology?**
A) Studying adult organ systems only
B) Studying similarities in early developmental stages to infer evolutionary relationships
C) Examining fossils exclusively
D) Comparing DNA sequences only

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21. Which trophic level experiences the highest concentration of pollutants through biomagnification?
- A) Primary producers
 - B) Primary consumers
 - C) Secondary consumers
 - D) Tertiary consumers**
22. Bioaccumulation of heavy metals in aquatic organisms is an example of:
- A) Air pollution
 - B) Water pollution**
 - C) Soil pollution
 - D) Noise pollution
23. Which of the following best describes prions?
- A) Single-celled organisms
 - B) Infectious proteins causing neurodegenerative diseases**
 - C) DNA viruses
 - D) Photosynthetic protists
24. Beta-lactamase enzymes produced by some bacteria:
- A) Destroy viral DNA
 - B) Break down beta-lactam antibiotics like penicillin**
 - C) Stimulate the immune system
 - D) Enhance bacterial motility
25. Symbiotic relationships in the microbiome can include:
- A) Mutualism, commensalism, and parasitism**
 - B) Only mutualism
 - C) Only parasitism
 - D) Only competition