

Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2013

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

- 1. A bar graph is used to present mean heart rates of three groups after exercise. Why is it better to add error bars (standard deviation)?**
A) To make the graph look professional
B) To show the variability and reliability of the data
C) To reduce the need for statistical tests
D) To indicate the exact number of participants
- 2. What structural difference distinguishes the outer membrane of mitochondria from the inner membrane?**
A) The outer membrane is folded into cristae, while the inner membrane is smooth.
B) The inner membrane is folded into cristae, while the outer membrane is smooth.
C) Both membranes are smooth with no functional differences.
D) The outer membrane is selectively permeable, while the inner membrane is freely permeable
- 3. In oxidative phosphorylation, ATP is generated by:**
A) Substrate-level phosphorylation
B) Proton gradient-driven ATP synthase activity
C) Direct oxidation of glucose
D) Splitting of water molecules
- 4. In translation, the sequence of nucleotides in mRNA is read in:**
A) Groups of 2 bases (duplets)
B) Groups of 3 bases (codons)
C) Groups of 4 bases (quadruplets)
D) A continuous chain with no grouping
- 5. The role of microRNAs (miRNAs) in regulation of protein synthesis is:**
A) Binding ribosomes to speed up translation
B) Binding mRNA to degrade or block translation
C) Enhancing DNA replication
D) Assisting tRNA charging
- 6. Which genetic interaction occurs when one gene masks or suppresses the expression of another gene?**
A) Codominance
B) Incomplete dominance
C) Epistasis
D) Polygenic inheritance

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7. **Alternative splicing allows a single gene to:**
 - A) **Code for multiple different proteins**
 - B) Be permanently silenced
 - C) Increase mutation rates
 - D) Prevent translation entirely

8. **A child born to a mother who smoked heavily during pregnancy may exhibit altered gene expression without mutations. This is an example of:**
 - A) Genetic inheritance
 - B) **Epigenetic modification due to environmental exposure**
 - C) Chromosomal deletion
 - D) Mendelian dominance

9. **Which of the following is an advantage of genetically engineered crops?**
 - A) Reduced pesticide use
 - B) Increased yield
 - C) Improved nutritional content
 - D) **All of the above**

10. **Which structure in the male reproductive system produces sperm?**
 - A) Seminal vesicle
 - B) **Testes**
 - C) Prostate gland
 - D) Epididymis

11. **Which of the following is an example of passive immunity?**
 - A) Recovery from chickenpox
 - B) **Injection of antivenom after a snake bite**
 - C) Vaccination against polio
 - D) Infection with measles

12. **Which of the following is a mode of direct transmission for infectious diseases?**
 - A) Contaminated water
 - B) Mosquito bites
 - C) **Coughing and sneezing**
 - D) Food poisoning

13. **Alzheimer's disease is characterized by:**
 - A) Loss of dopamine-producing neurons in the substantia nigra
 - B) **Accumulation of beta-amyloid plaques and neurofibrillary tangles**
 - C) Demyelination of neurons
 - D) Autoimmune attack on acetylcholine receptors

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14. Genetic mutations contribute to evolution by:
- A) **Creating new alleles that may be subject to natural selection**
 - B) Immediately producing new species
 - C) Eliminating all variation in a population
 - D) Preventing adaptation
15. Transitional fossils, like Archaeopteryx, demonstrate:
- A) **Evolutionary links between major groups**
 - B) Fully modern species
 - C) Non-related species only
 - D) Artificially created hybrids
16. Which of the following is a major cause of biodiversity loss?
- A) Habitat destruction
 - B) Pollution
 - C) Overexploitation of resources
 - D) **All of the above**
17. Which of the following is a mitigation strategy for climate change?
- A) Reforestation and afforestation
 - B) Reducing fossil fuel consumption
 - C) Promoting renewable energy sources
 - D) **All of the above**
18. Bacterial conjugation is a process of:
- A) Sexual reproduction producing genetically identical cells
 - B) **Horizontal gene transfer via plasmid exchange**
 - C) Binary fission
 - D) Transformation of viral DNA
19. Which of the following is an example of antibiotic stewardship?
- A) **Prescribing antibiotics only when necessary**
 - B) Self-medicating with leftover antibiotics
 - C) Using antibiotics for viral infections
 - D) Using higher doses than recommended
20. Probiotics are:
- A) Pathogenic bacteria
 - B) **Live microorganisms that confer health benefits to the host**
 - C) Chemical disinfectants
 - D) Viruses used in gene therapy
21. In a neutral atom, if the number of electrons is increased, the atom becomes:
- A) A cation
 - B) **An anion**
 - C) An isotope
 - D) Electrically neutral

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22. The s-block elements include:

- A) Groups 1 and 2
- B) Groups 13 and 14
- C) Groups 15 and 16
- D) Transition metals

23. Which property distinguishes ionic and covalent compounds?

- A) Ionic compounds conduct electricity when dissolved in water; covalent compounds usually do not
- B) Covalent compounds are always metallic
- C) Ionic compounds are gases at room temperature
- D) Covalent compounds have free electrons

24. The bond angle in tetrahedral molecules is approximately:

- A) 90°
- B) 109.5°
- C) 120°
- D) 180°

25.

26. Which biotechnological method is used to produce insect-resistant crops such as Bt cotton?

- A) RNA interference
- B) Introducing a gene from *Bacillus thuringiensis*
- C) Hybridization of two non-related species
- D) Treatment with chemical mutagens

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