Markhor Junior Contest ®

Aspirant Level (Class IX, X, O/A Level) Science 2014

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

1. **In an investigation, the correlation coefficient (r) between study hours and test scores is +0.85. What does this mean?**
   A) More study hours cause lower test scores.
   B) Strong positive relationship: higher study hours tend to match higher scores.
   C) There is no relationship.
   D) It proves studying guarantees success.

2. **Which correctly pairs the organelle with its function?**
   A) Lysosome – synthesis of lipids
   B) Nucleolus – production of ribosomal subunits
   C) Peroxisome – packaging of proteins
   D) Smooth ER – ATP synthesis

3. **During anaerobic respiration in human muscle cells, pyruvate is converted into:**
   A) Ethanol and CO_2
   B) Lactic acid
   C) Acetyl-CoA
   D) Glucose

4. **What is the main function of tRNA in translation?**
   A) Carrying amino acids to the ribosome according to codons in mRNA
   B) Catalyzing peptide bond formation
   C) Acting as a template for DNA synthesis
   D) Carrying the genetic code from the nucleus to the cytoplasm

5. **Which of the following correctly matches a post-translational modification with its effect?**
   A) Phosphorylation – activation or inactivation of enzymes
   B) Methylation – adds amino acids to proteins
   C) Glycosylation – removes sugars from proteins
   D) Ubiquitination – stabilizes proteins permanently

6. **If two genes are linked on the same chromosome, which statement is true?**
   A) They always assort independently.
   B) They tend to be inherited together.
   C) They never cross over.
   D) Their inheritance follows Mendel's 9:3:3:1 ratio.

7. Which type of RNA can silence gene expression by binding to complementary mRNA sequences?

A) tRNA
B) rRNA
C) siRNA/miRNA
D) snRNA

8. Which statement best describes epigenetic reprogramming in early embryonic development?

A) All DNA methylation marks are preserved
B) Most epigenetic marks are erased and reset
C) Only mutations are passed to gametes
D) Histones are permanently inactivated

9. In reproductive cloning, the offspring is:

A) Genetically identical to the donor organism
B) A hybrid of two parents
C) Always produced by sexual reproduction
D) Genetically different from both parents

10. In medical biotechnology, recombinant proteins such as human growth hormone are produced using:

A) Eukaryotic cells only
B) Bacterial or yeast expression systems
C) Plant chloroplasts exclusively
D) CRISPR knockouts

11. The exchange of gases in the lungs occurs at:

A) Bronchi
B) Trachea
C) Alveoli
D) Diaphragm

12. Which type of vaccine contains weakened live pathogens?

A) Inactivated vaccine
B) Live attenuated vaccine
C) Subunit vaccine
D) mRNA vaccine

13. Which type of disease is directly influenced by genetic inheritance?

A) Malaria
B) Hemophilia
C) Influenza
D) Typhoid

14. Which part of the brain is critical for long-term memory formation?
A) Amygdala
B) Hippocampus
C) Thalamus
D) Pons

15. Which type of adaptation is physiological?
A) Countershading in fish
B) Producing antifreeze proteins in polar fish
C) Birds building nests
D) Long claws in predators

16. Which is an example of molecular homology?
A) Same limb bones in mammals
B) Similar sequences of cytochrome c in different species
C) Wings of birds and insects
D) Teeth shape in herbivores and carnivores

17. Which conservation strategy focuses on protecting ecosystems and natural habitats rather than individual species?
A) In situ conservation
B) Ex situ conservation
C) Captive breeding
D) Zoos and botanical gardens

18. Soil erosion due to deforestation mainly results from:
A) Reduced rainfall
B) Loss of tree roots that stabilize the soil
C) Increased herbivore activity
D) Decomposition of organic matter

19. Which protist is responsible for malaria?
A) Trypanosoma
B) Plasmodium
C) Euglena
D) Amoeba

20. Which of the following is a global health threat associated with antibiotic resistance?
A) Tuberculosis resistant to multiple drugs (MDR-TB)
B) Seasonal influenza
C) Common cold
D) Non-infectious diseases

21. Which technique is commonly used to study microbial diversity without culturing?

A) 16S rRNA gene sequencing
B) Gram staining
C) Light microscopy only
D) Antibiotic sensitivity testing

22. Which of the following is true about Carbon-14?

A) It has 14 protons
B) It has 6 protons and 8 neutrons
C) It has 6 neutrons and 8 protons
D) It has 14 electrons in neutral form

23. Which pair of elements shows a large increase in first ionization energy due to achieving a stable electron configuration?

A) Magnesium → Aluminum
B) Nitrogen → Oxygen
C) Neon → Sodium
D) Sodium → Magnesium

24. Metallic bonding involves:

A) Delocalized electrons moving freely through a lattice of positive ions
B) Sharing of electron pairs between two atoms
C) Electrostatic attraction between oppositely charged ions
D) Hydrogen bonding between molecules

25. Which type of neuron transmits signals from sensory organs to the central nervous system?

A) Motor neuron
B) Interneuron
C) Sensory neuron
D) Efferent neuron