Fundamentals of Genetics

Genetics · Answer Key · 25 Questions

1. Which molecule carries the genetic instructions for the development and functioning of all known living organisms?

A) Deoxyribonucleic acid
B) Adenosine triphosphate
C) Ribonucleic acid
D) Hemoglobin

2. What are the alternative forms of a specific gene located at a given position on a chromosome?

A) Alleles
B) Gametes
C) Zygotes
D) Proteins

3. In human cells, how many pairs of chromosomes are typically contained within the nucleus?

A) 22
B) 23
C) 46
D) 48

4. Which nitrogenous base is found in RNA but not in DNA?

A) Cytosine
B) Guanine
C) Thymine
D) Uracil

5. What term describes an organism that has two identical alleles for a particular trait?

A) Heterozygous
B) Homozygous
C) Dominant
D) Recessive

6. Who is widely considered the father of modern genetics due to his experiments with pea plants?

A) Charles Darwin
B) Louis Pasteur
C) Gregor Mendel
D) James Watson

7. What is the physical expression or observable characteristic of an individual's genetic makeup called?

A) Genotype
B) Karyotype
C) Phenotype
D) Genome

8. Which process results in the formation of four genetically diverse haploid daughter cells?

A) Mitosis
B) Meiosis
C) Binary fission
D) Transcription

9. What is the sugar component found in the backbone of a DNA molecule?

A) Glucose
B) Ribose
C) Deoxyribose
D) Fructose

10. Which enzyme is responsible for synthesizing new DNA strands during replication?

A) DNA polymerase
B) Amylase
C) Pepsin
D) Lipase

11. What is a permanent alteration in the DNA sequence that makes up a gene?

A) Mutation
B) Translation
C) Recombination
D) Transcription

12. In Mendelian genetics, what is the ratio of offspring expected in the F2 generation from a cross between two heterozygotes (Aa x Aa)?

A) 1:1
B) 2:1
C) 3:1
D) 9:3:3:1

13. Which structure within a cell serves as the site for protein synthesis?

A) Mitochondria
B) Nucleus
C) Ribosome
D) Lysosome

14. What type of bond holds the complementary nitrogenous bases together in a DNA double helix?

A) Ionic bond
B) Covalent bond
C) Hydrogen bond
D) Metallic bond

15. What is the specific location of a gene on a chromosome called?

A) Locus
B) Centromere
C) Telomere
D) Chromatid

16. How many bases of DNA code for a single amino acid?

A) One
B) Two
C) Three
D) Four

17. Which term refers to the complete set of genetic material present in an organism?

A) Proteome
B) Genome
C) Transcriptome
D) Chromatin

18. What is the primary function of mRNA in the cell?

A) Storing genetic information
B) Catalyzing chemical reactions
C) Carrying genetic code to ribosomes
D) Providing structural support

19. Which pair of sex chromosomes indicates a biological male in humans?

A) XX
B) XY
C) YY
D) XO

20. What is the name of the process by which DNA is copied into RNA?

A) Translation
B) Replication
C) Transcription
D) Transformation

21. Which part of the chromosome protects it from deterioration during cell division?

A) Centromere
B) Telomere
C) Exon
D) Intron

22. What does 'genotype' specifically refer to?

A) The physical appearance
B) The genetic constitution of an individual
C) The environmental influence on traits
D) The number of cells in an organism

23. What is an organism that contains genetic material from a different species called?

A) Mutant
B) Transgenic
C) Haploid
D) Polyploid

24. Which of these is a purine base found in DNA?

A) Cytosine
B) Thymine
C) Adenine
D) Uracil

25. What is the function of the centromere during cell division?

A) To produce proteins

B) To hold sister chromatids together

C) To replicate DNA

D) To transport waste out of the cell