

True/False

Q10. Which of the following is the first genetically engineered rice?

- a. Silver rice
- b. Golden rice
- c. Brown rice
- d. Basmati rice

SECTION C: CRITICAL THINKING

Q1. Why is biotechnology a field of diverse sciences? Explain.

Q2. More than 3000 diseases are known to result from genetic mutations, so how can one correct these genetic mutations to cure the disorders?

Q3. Do you believe that ethical issues are hindrances in the development and progress of the field of biotechnology? Why?

CHAPTER 2 GENES & GENOMICS

PROBLEMS

SECTION A: DESCRIPTIVE TYPE

Q1. What is the cell theory?

Q2. Describe the characteristics of a prokaryotic cell.

Q3. Explain Mendelian genetics.

Q4. Explain supercoiling in a DNA molecule.

Q5. Describe the role of DNA polymerase in replication.

Q6. What are topoisomerases and helicases?

Q7. How does DNA methylation occur?

Q8. What is a PCR?

Q9. How is forensic DNA profiling done with a PCR tool?

SECTION B: MULTIPLE CHOICES

Q1. Humans have an estimated number of cells.

- a. 100 billion
- b. 1000 billion
- c. 100 trillion
- d. 5 trillion

Q2. Who was the first to study the internal structure of a cell?

- a. Robert Hooke
- b. Leeuwenhoek
- c. Dutrochet
- d. Charles Darwin

Q3. Do viruses fit in the cell theory concept?

- a. Yes
- b. No

Q4. Prokaryotes carry extra-chromosomal DNA molecules which are called ...

- a. Nucleus
- b. Plasmids
- c. Mitochondria
- d. Ribosome

- Q5. In eukaryotes, non-nuclear DNA is located in ...
- a. Endoplasmic reticulum
 - b. Mitochondria
 - c. Golgi bodies
 - d. Chromatin
- Q6. Cell surface membranes contain receptor proteins that allow cells to detect external signaling molecules such as hormones. True/False
- Q7. What is common to mitochondria and chloroplast?
- a. Both do not contain their own genome.
 - b. Both contain their own genome.
 - c. Both are present in prokaryotes.
- Q8. Except for , all living organisms have genetic information stored in their DNA.
- a. Retroviruses
 - b. Bacteria
 - c. Fungi
- Q9. Nuclear DNA is linear whereas mitochondria DNA is circular. True/False
- Q10. Glycogen is a polysaccharide used by animals to store energy. True/False
- Q11. Mendel observed that organisms inherit traits called ...
- a. DNA
 - b. Genes
 - c. Proteins
- Q12. One of the major differences between DNA and RNA is ...
- a. Protein
 - b. Hormones
 - c. Sugar
 - d. Phosphate
- Q13. When DNA is twisted in the direction of helix, this is called supercoiling.
- a. Positive
 - b. Negative
 - c. Linear
- Q14. Messenger RNA encodes for ...
- a. Gene expression
 - b. Protein synthesis
 - c. Both protein and gene expression
- Q15. What is the protein manufacturing machine of all living cells?
- a. Ribosome
 - b. Golgi bodies
 - c. Endoplasmic reticulum
- Q16. Meiosis is a process of reduction of division in which the number of chromosomes increases to double. False/True
- Q17. Replication in DNA is done by the enzyme ...
- a. Polymerase
 - b. Endonuclease
 - c. Exonuclease
 - d. Telomerase
- Q18. The structural change in the DNA sequence is called ...
- a. DNA methylation

- b. DNA mutation
 - c. DNA replication
- Q19. Who invented the PCR?
- a. James Watson
 - b. Kary Mullis
 - c. Ian Wilmut
- Q20. Nested PCR is used to increase the specificity of amplification.
- a. RNA
 - b. DNA
 - c. Both DNA and RNA
 - d. None of them

SECTION C: CRITICAL THINKING

- Q1. In order to identify the real culprit among a group of crime suspects, what technique can be used to establish the identity of the culprit? Explain with suitable examples.
- Q2. Is it possible to study the genetic information of an individual by working with mRNA only? Explain.
- Q3. What would be the status of gene expression in case mRNA is not available?
- Q4. What will happen if nuclear DNA is circular in shape and mitochondrial DNA is linear in shape?

CHAPTER 3 PROTEINS & PROTEOMICS

PROBLEMS

SECTION A: DESCRIPTIVE TYPE

- Q1. Explain the function of proteins as enzymes.
- Q2. Explain the role of proteins in cell signaling.
- Q3. What are the different kinds of nonessential amino acids?
- Q4. What is a protein biosynthesis?
- Q5. Discuss transcription in prokaryotes and eukaryotes.
- Q6. Describe the tools for studying the structure of proteins.
- Q7. What is protein folding?
- Q8. Describe the regulation of gene expression for protein synthesis.
- Q9. What is an operon model for gene regulation?

SECTION B: MULTIPLE CHOICE

- Q1. About how many reactions are known to be catalyzed by enzymes?
- a. 3000
 - b. 4500
 - c. 4000
 - d. 5000
- Q2. Cystine and aspartic acids are the nonessential amino acids. True/False
- Q3. Protein synthesis starts with translation of proteins. True/False
- Q4. Make correct pair
- a. Upstream process 3'UTR
 - b. Down stream process 5'UTR
- Q5. What is the most common type of core promoter in eukaryotes?