

True/False

- Q10. Which of the following is the first genetically engineered rice?
- Silver rice
 - Golden rice
 - Brown rice
 - 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.
- 100 billion
 - 1000 billion
 - 100 trillion
 - 5 trillion
- Q2. Who was the first to study the internal structure of a cell?
- Robert Hooke
 - Leeuwenhoek
 - Dutrochet
 - Charles Darwin
- Q3. Do viruses fit in the cell theory concept?
- Yes
 - No
- Q4. Prokaryotes carry extra-chromosomal DNA molecules which are called ...
- Nucleus
 - Plasmids
 - Mitochondria
 - Ribosome

- Q5. In eukaryotes, non-nuclear DNA is located in ...
- Endoplasmic reticulum
 - Mitochondria
 - Golgi bodies
 - 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?
- Both do not contain their own genome.
 - Both contain their own genome.
 - Both are present in prokaryotes.
- Q8. Except for , all living organisms have genetic information stored in their DNA.
- Retroviruses
 - Bacteria
 - 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 ...
- DNA
 - Genes
 - Proteins
- Q12. One of the major differences between DNA and RNA is ...
- Protein
 - Hormones
 - Sugar
 - Phosphate
- Q13. When DNA is twisted in the direction of helix, this is called supercoiling.
- Positive
 - Negative
 - Linear
- Q14. Messenger RNA encodes for ...
- Gene expression
 - Protein synthesis
 - Both protein and gene expression
- Q15. What is the protein manufacturing machine of all living cells?
- Ribosome
 - Golgi bodies
 - 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 ...
- Polymerase
 - Endonuclease
 - Exonuclease
 - Telomerase
- Q18. The structural change in the DNA sequence is called ...
- 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?