UNIT II NUCLEIC ACID, PROTEIN AND BLOOD CHEMISTRY

DNA: Nucleoside & Nucleotide - Watson and Crick Model of DNA

1. **What is a nucleoside composed of?**
    a. Sugar and phosphate
    b. Sugar and nitrogenous base
    c. Phosphate and nitrogenous base
    d. Sugar, phosphate, and nitrogenous base
2. **What is a nucleotide composed of?**
    a. Sugar and phosphate
    b. Sugar and nitrogenous base
    c. Phosphate and nitrogenous base
    d. Sugar, phosphate, and nitrogenous base
3. **Which of the following is a pyrimidine base?**
    a. Adenine
    b. Thymine
    c. Guanine
    d. Cytosine
4. **Who proposed the double-helix model of DNA?**
    a. Hershey and Chase
    b. Watson and Crick
    c. Meselson and Stahl
    d. Griffith
5. **Which type of bond holds the two strands of DNA together?**
    a. Ionic bonds
    b. Covalent bonds
    c. Hydrogen bonds
    d. Van der Waals forces
6. **Which of the following is NOT a characteristic of DNA?**
    a. Double-stranded
    b. Contains uracil

c. Contains thymine
d. Has a sugar-phosphate backbone

7. **Which of the following base pairs is correct according to the Watson and Crick model?**
    a. Adenine – Cytosine
    b. Guanine – Uracil
    c. Adenine – Thymine
    d. Thymine – Guanine
8. **What is the orientation of the two DNA strands in the double helix?**
    a. Parallel
    b. Antiparallel
    c. Perpendicular
    d. Random
9. **Which of the following enzymes is responsible for DNA replication?**
    a. RNA polymerase
    b. DNA polymerase
    c. Ligase
    d. Helicase
10. **What is the function of the phosphate group in a nucleotide?**
    a. To store genetic information
    b. To connect to other nucleotides
    c. To provide energy
    d. To attach to a nitrogenous base

Structure of RNA and Its Types

11. **Which of the following is a type of RNA?**
    a. tRNA
    b. cDNA
    c. mRNA
    d. Both A and C
12. **Which base is unique to RNA?**

a. Adenine
b. Guanine
c. Thymine
d. Uracil

13. **What is the primary function of mRNA?**
    a. Transfer amino acids
    b. Carry genetic information from DNA to the ribosome
    c. Form the ribosome
    d. Regulate gene expression
14. **Which RNA molecule carries amino acids to the ribosome during translation?**
    a. mRNA
    b. rRNA
    c. tRNA
    d. snRNA
15. **What type of RNA is a component of ribosomes?**
    a. mRNA
    b. rRNA
    c. tRNA
    d. miRNA
16. **Which process converts DNA to RNA?**
    a. Translation
    b. Replication
    c. Transcription
    d. Splicing
17. **Which type of RNA is involved in gene regulation?**
    a. mRNA
    b. rRNA
    c. tRNA
    d. miRNA
18. **Which enzyme is responsible for transcribing DNA into RNA?**
    a. DNA polymerase

b. RNA polymerase
c. Ligase
d. Helicase

19. **What is the role of rRNA in the cell?**
    a. To carry the genetic code
    b. To form the ribosome and catalyze protein synthesis
    c. To transport amino acids
    d. To replicate DNA
20. **Which of the following is NOT a function of RNA?**
    a. Storage of genetic information
    b. Catalysis of protein synthesis
    c. Transfer of genetic information
    d. Regulation of gene expression

Protein Biosynthesis

21. **Where does translation occur in the cell?**
    a. Nucleus
    b. Mitochondria
    c. Ribosome
    d. Golgi apparatus
22. **What is the first amino acid in most newly synthesized proteins?**
    a. Valine
    b. Leucine
    c. Methionine
    d. Glycine
23. **Which of the following is NOT involved in translation?**
    a. mRNA
    b. rRNA
    c. tRNA
    d. DNA
24. **Which molecule serves as the template for protein synthesis?**

a. DNA
b. mRNA
c. tRNA
d. rRNA

25. **The sequence of three nucleotides on mRNA that codes for a specific amino acid is called a:**
    a. Anticodon
    b. Codon
    c. Intron
    d. Exon
26. **Which of the following molecules is responsible for matching amino acids to the corresponding mRNA codon?**
    a. mRNA
    b. rRNA
    c. tRNA
    d. snRNA
27. **What is the role of the ribosome in protein synthesis?**
    a. To transcribe DNA
    b. To translate mRNA into a polypeptide chain
    c. To transport amino acids
    d. To replicate DNA
28. **Which process involves the removal of introns from mRNA?**
    a. Translation
    b. Transcription
    c. Splicing
    d. Replication
29. **What does the term "polypeptide" refer to?**
    a. A chain of nucleotides
    b. A chain of amino acids
    c. A chain of sugars
    d. A chain of lipids

30. **What signals the end of translation?**
    a. A start codon
    b. A stop codon
    c. A promoter
    d. An enhancer

Blood – Blood Grouping, Hemolysis, Anticoagulants, Preservation of Blood, Deproteinization of Blood

31. **What determines a person's blood group?**
    a. DNA
    b. Proteins in the blood
    c. Antigens on the surface of red blood cells
    d. Antibodies in the plasma
32. **Which blood type is considered the universal donor?**
    a. A+
    b. AB+
    c. O+
    d. O-
33. **Which blood type is considered the universal recipient?**
    a. A+
    b. AB+
    c. O+
    d. O-
34. **What is hemolysis?**
    a. The formation of new blood cells
    b. The destruction of red blood cells
    c. The clotting of blood
    d. The production of antibodies
35. **Which anticoagulant is commonly used during blood collection?**
    a. Sodium citrate
    b. Heparin

c. EDTA

d. All of the above

36. **What is the primary function of anticoagulants?**

a. To destroy red blood cells

b. To prevent blood clotting

c. To enhance immune response

d. To promote blood clotting

37. **How is blood typically preserved for transfusions?**

a. By freezing

b. By adding preservatives like CPD (Citrate Phosphate Dextrose)

c. By drying

d. By heating

38. **What is the purpose of deproteinization of blood?**

a. To remove antibodies

b. To remove proteins for specific laboratory analyses

c. To enhance oxygen transport

d. To promote clotting

39. **Which of the following is a common method for deproteinization of blood samples?**

a. Heating

b. Centrifugation

c. Use of chemicals like trichloroacetic acid (TC

d. Filtration

40. **What can cause hemolysis during blood collection?**

a. High temperature

b. Excessive shaking of the blood sample

c. Slow collection process

d. All of the above

41. **Which blood group system is the most clinically significant?**

a. Rh system

b. Kell system

c. ABO system

d. Duffy system

42. **What is the Rh factor?**
    a. A protein found on the surface of red blood cells
    b. A type of antibody
    c. A type of white blood cell
    d. A blood clotting factor
43. **Which blood group is most susceptible to hemolytic disease of the newborn (HDN)?**
    a. AB+
    b. O-
    c. A+
    d. Rh-negative
44. **Which of the following conditions can be prevented by the use of anticoagulants?**
    a. Anemia
    b. Thrombosis
    c. Leukemia
    d. Hemophilia
45. **What is the primary role of red blood cells in the body?**
    a. To fight infections
    b. To carry oxygen from the lungs to tissues
    c. To produce antibodies
    d. To form blood clots
46. **Which anticoagulant is commonly used for preserving blood samples for glucose testing?**
    a. Sodium fluoride
    b. EDTA
    c. Heparin
    d. Citrate
47. **What is the shelf life of blood stored in CPD solution at 4°C?**
    a. 1 day
    b. 7 days
    c. 21 days

d. 35 days

48. **Which of the following blood components is responsible for clot formation?**
    a. Red blood cells
    b. White blood cells
    c. Platelets
    d. Plasma
49. **What happens during the deproteinization process in blood?**
    a. Removal of antibodies
    b. Separation of plasma from cells
    c. Precipitation and removal of proteins
    d. None of the above
50. **Which of the following is used to prevent coagulation in blood samples?**
    a. Tris buffer
    b. Sodium bicarbonate
    c. Sodium citrate
    d. Sodium chloride

Answer

1. b
2. d
3. d
4. b
5. c
6. b
7. c
8. b
9. b
10. b
11. d
12. d
13. b
14. c
15. b
16. c
17. d
18. b

19. b
20. a
21. c
22. c
23. d
24. b
25. b
26. c
27. b
28. c
29. b
30. b
31. c
32. d
33. b
34. b
35. d
36. b
37. b
38. b
39. c
40. b
41. c
42. a
43. d
44. b
45. b
46. a
47. d
48. c
49. c
50. c