

Chapter 6
MOLECULAR BASIS OF INHERITANCE

1mark each

1. Why is the ADA enzyme required in our body?
2. Which is not required for polypeptide synthesis: Termination codon, mRNA, peptidyl transferase, rRNA?
3. Due to a mistake during transcription, ATG forms UAG in mRNA. What change would occur in the polypeptide chain translated by this mRNA?
4. What are introns?
5. Name the enzyme that can break and seal one strand of DNA.
6. Give the full form of YAC and BAC.

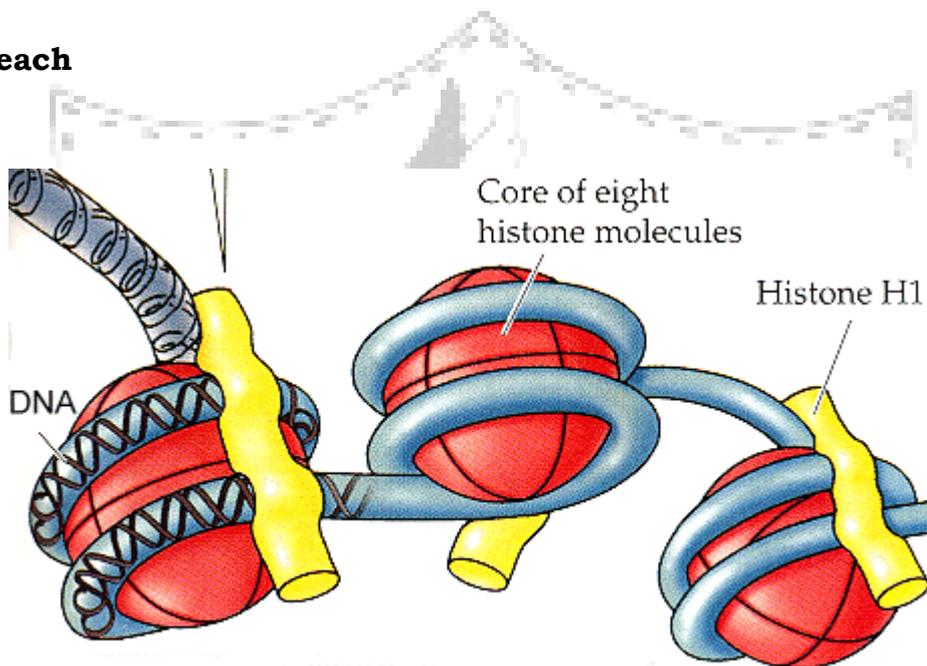
2marks each

1. What is aneuploidy? Give an example from human genetics which shows this problem.
2. In *Drosophila*, why do genes for white eyes and yellow body show less % recombination than white eyes and miniature wings?
3. The base sequence of a strand of DNA is
TACTATTGCATAATT - - - anti sense strand
ATGATAACGTATTAA- - - sense strand
 - a) Give the sequence of mRNA formed from this DNA.
 - b) What is the significance of the ATT sequence?
 - c) What would happen if base C (underlined) is deleted?
4. State the central Dogma. Give the features of a DNA helix.
5. Identify the protocol shown below and describe it briefly.

6. Describe the 2 processes unique to eukaryotic transcription.
7. State the role of DNA Polymerase in DNA replication
8. State the role of RNA polymerase in transcription, DNA replication.
9. Why the lac operon is called the inducible system?
10. What is a genetic code? Who proposed the triplet nature of Genetic Code. State any 2 other characteristics of the genetic code.
11. How can an XXY individual be born to a human?
12. What acts as the inducer in lac operon? How does it switch on the operon?
13. What are the components of an operon? State their functions.
14. Name the initiation and the termination codons.
15. Explain what happens in frame shift mutations. Name 1 disease that is caused by this kind of mutation.

3 marks each

1)



- i. Identify and give the significance of the structure.
- ii. What is the significance of this kind of coiling?
- iii. What would happen to this structure later in the cell cycle in the M- phase?

5.



- What is depicted in the diagram?
- Give the principle of the technique.
- Who is the real criminal? Why?

- What are Okazaki fragments? Name 2 enzymes necessary for DNA replication. Enlist the functions of DNA polymerase.
- List the steps involved in the elongation of polypeptide chain during protein synthesis.
- What was the purpose of Griffith's experiment? Describe his protocol.
- An mRNA strand has a series of codons out of which three are mentioned below. (i) AUG, (ii) UUU, (iii) UAG.
 - What will these codons translated to?

(b) What are the DNA sequences that would have transcribed these RNA codons?

5 marks each

1) What do you understand by an inducible system? Describe an inducible system that is operative in bacteria. What is another name for this kind of regulation?

2) Explain the principle of DNA fingerprinting.

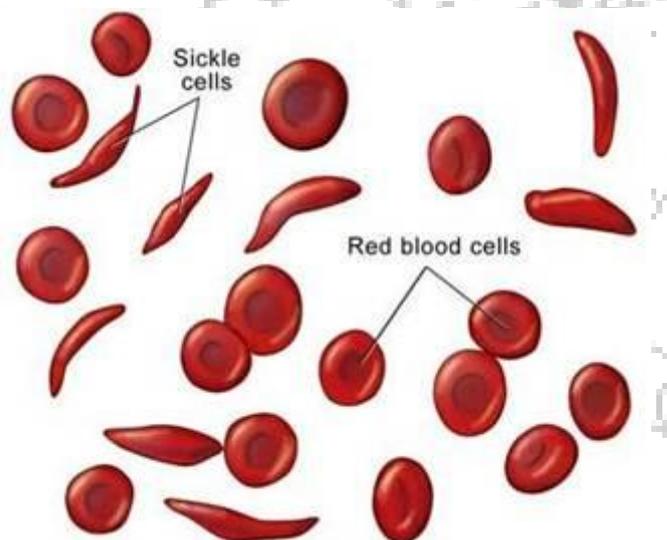
3) A segment of DNA, GCCAGGGGATG was translated into the oligopeptide arg-ser-pro-thr.

a) What was the base sequence in the mRNA transcribed from the DNA segment?

b) What are the codons for these amino acids?

c) If the first adenine in the DNA gets substituted by guanine what will the mRNA be, the anticodons on the tRNA be?

4) The diagram below shows a molecular disease.



a) Identify the disease and give its cause.

b) What are the symptoms of the disease?

c) In spite of this mutation being deleterious in the homozygous state, why has it not been eliminated?

5 Describe any 6 features of human genome.

6 Explain the following experiments along with the discovery that they were responsible for

- a) Hershey and Chase
- b) Griffith
- c) Avery McLeod and McCarty

