Molecular Basis of Inheritance

CHAPTER-6

1. Group the following as nitrogenous bases and nucleosides:
   Adenine, Cytidine, Thymine, Guanosine, Uracil and Cytosine.
2. If a double stranded DNA has 20 per cent of cytosine, calculate the per cent of adenine in the DNA.
3. If the sequence of one strand of DNA is written as follows:

   5′-ATGCATGCATGCATGCATGCATGCATGC-3′

   Write down the sequence of complementary strand in 5′→3′ direction.
4. If the sequence of the coding strand in a transcription unit is written as follows:

   5′-ATGCATGCATGCATGCATGCATGCATGC-3′

   Write down the sequence of mRNA.
5. Which property of DNA double helix led Watson and Crick to hypothesise semi-conservative mode of DNA replication? Explain.
6. Depending upon the chemical nature of the template (DNA or RNA) and the nature of nucleic acids synthesised from it (DNA or RNA), list the types of nucleic acid polymerases.
7. How did Hershey and Chase differentiate between DNA and protein in their experiment while proving that DNA is the genetic material?
8. Differentiate between the followings:
   (a) Repetitive DNA and Satellite DNA
   (b) mRNA and tRNA
   (c) Template strand and Coding strand
9. List two essential roles of ribosome during translation.
10. In the medium where *E. coli* was growing, lactose was added, which induced the *lac* operon. Then, why does lac operon shut down some time after addition of lactose in the medium?
11. Explain (in one or two lines) the function of the followings:
    (a) Promoter
    (b) tRNA
    (c) Exons
12. Why is the Human Genome project called a mega project?
13. What is DNA fingerprinting? Mention its application.
14. Briefly describe the following:
    (a) Transcription
    (b) Polymorphism
    (c) Translation
    (d) Bioinformatics