

BIOCHEMISTRY

PG 3rd Semester

1. Discuss the catalytic roles of DNA polymerases in DNA replication. What is the role of the enzyme helicase in the replication process? 3
2. Draw the structures of the purine nucleotides. What is Chargaff's rule? 4
3. What do you understand by melting of a double helical DNA? How do you determine melting temperature (T_m)? What are the factors on which the melting temperature of a DNA molecule depends? $1+1+2 = 4$
4. Describe the roles of the enzymes DNA polymerases I-V in DNA replication. What does helicase do in a propagating replication fork? $3+1=4$
5. Why are the genetic codes degenerate in nature? Write down the initiation and non-sense codon and the corresponding amino acids that are coded by them. 4
6. Discuss the secondary structure of t-RNA. What is the role of m-RNA in protein synthesis? 4
7. What are nucleotides? Draw the structures of deoxyadenosine monophosphate (dAMP) and deoxycytidine monophosphate (dCMP). 3
8. Describe the roles of the enzymes DNA polymerase I and III in the lagging and leading strands during DNA replication. 3
9. Discuss about the tertiary structure of t-RNA showing all the active sites. 4
10. What is t-RNA? Discuss about the three different loops that exist in t-RNA molecule with a pictorial diagram. 2
11. What do you mean by triplet codon? Why genetic codes are degenerate in nature? Write the initiation and termination codons present in eukaryotic cell. 2
12. Discuss the chain initiation and chain elongation steps in protein synthesis. 4
13. Draw the structures of the pyrimidine nucleobases present in nucleic acids. How do they differ in their presence in DNA and RNA? 3
14. Compare the A-, B- and Z- form of double helical DNA in terms of their helical sense, base pairs per helical turn and base tilt normal to the helical axis. What is the most common type of DNA present in physiological condition? 3

15. Discuss briefly the roles of the enzymes helicase, topoisomerase I and gyrases in DNA replication process. 3
16. What are the fundamental differences between RNA and DNA polymerases? What is RNA splicing?
17. What is a wobble base? What is the role of m-RNA in protein synthesis? 2
18. Discuss the various steps involved in protein biosynthesis. 4
19. Write down the initiation and nonsense codon and the corresponding amino acids that are coded by them. 2
20. What is semiconservative DNA replication? Discuss briefly how density gradient ultracentrifugation technique was used to prove that DNA replication is semiconservative. 1+3 =4
21. Describe sugar pucker and glycosyl bond conformation in DNA. Compare among A, B and Z types of duplex DNA in terms of sugar pucker and glycosyl bond conformation. 4
22. What are okazaki fragments? 1