

Anekant Education Society's  
**Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati**  
**Post Graduate Department of Zoology**  
**M.Sc. I Zoology SEM-II: (Autonomous) 2019-20**

**Question bank for ZOO: 4201 (T) Molecular Biology (4C)**

**Define and Explain:**

1. Define Phosphodiester linkage.
2. What are nucleosomes?
3. Define nucleotide.
4. What is transposition?
5. What is satellite DNA?
6. What are Okazaki fragments?
7. What are spliceosome?
8. What is RNA editing?
9. What are transposons?
10. Define nucleoside.
11. Ribosome
12. Heterochromatin
13. What is chromosomal aberration?
14. What is recombination?
15. Euchromatin
16. Define transcription?
17. What is central dogma of molecular biology?
18. What are cloning vectors?
19. SINES
20. LINES

**Short answer Questions:**

1. Describe the structure and function of tRNA
2. Explain the mismatch repair.
3. What are histones? Give their significance.
4. Explain the mechanism of elongation process of protein synthesis.
5. Write a note on replicative transposons.
6. Explain the temperature melting of DNA.
7. Explain the role of eIF2 in regulation of protein synthesis.
8. Explain in detail initiation of DNA replication.
9. Explain the structure and function of DNA polymerase in prokaryotes.
10. Explain the mechanism of photo reactivation.
11. Explain mechanism of mRNA splicing.
12. Write a note on glycosylation.
13. Write a note on Ribonucleoprotein

14. Write a note on structure and function of ribosome.
15. Write a note on LINES and SINES.
16. Write a note on genetic code.
17. Explain the initiation of DNA replication in prokaryotes.
18. Explain elongation and proofreading of DNA strand during replication.
19. State the function of DNA ligase in replication of eukaryotes.
20. What are nucleosomes? Explain higher order chromatin structure.

### **Long Answer Questions:**

1. Explain the structure and function of tRNA.
2. What are transposons?
3. Explain the structure of Eukaryotic ribosome and give its function.
4. Explain Base excision repair.
5. Explain the structure and function of DNA polymerase in prokaryotes.
6. Explain the mechanism of DNA damage by UV rays.
7. Define nucleotide.
8. Explain the mechanism of modification of mRNA at 5' end.
9. Explain the mechanism of elongation of protein synthesis.
10. Protein folding.
11. DNA topology.
12. Promoter sequences.
13. Cot  $\frac{1}{2}$  and its importance.
14. Explain SOS repair system.
15. Why are t-RNAs called as adaptor molecule?
16. Explain Holliday junction model.
17. Explain steps involved in charging of t-RNA.
18. Write note on Composite & non-composite transposons.
19. Explain nucleotide excision repair mechanism.
20. Explain Signal hypothesis for protein targeting.

### **Short Notes:**

1. Initiation of protein synthesis.
2. c-value paradox.
3. Structure and function of ribosome.
4. Retro transposons.
5. What is alternative splicing?
6. Give the role of topoisomerase in DNA replication.
7. What role glycosylation plays in protein targeting?
8. Describe two mechanisms by which genetic elements are able to move from one site to the other in the genome?
9. How does methylation of DNA affect gene expression? How is related
10. Histone acetylation or methylation?
11. How does mRNA differ functionally in eukaryotes & prokaryotes?

12. Explain the need for post transcriptional modifications.
13. Explain chromatin remodelling.
14. Explain the mitochondrial transportation of protein.
15. Explain in detail B form of DNA.
16. Explain the base excision repair.
17. What is the role of helicase in DNA replication?
18. Explain mechanism of mRNA splicing.
19. Explain the temperature melting of DNA.
20. Explain the hyperchromicity with respect to DNA.
21. Explain the mechanism of Okazaki fragments maturation.
22. Explain the structure and function of tRNA.
23. Explain the significance of promoters during transcription in bacteria.
24. Base analogues cause mutations. Explain.
25. Write a note on processing of mRNA at 5' end.
26. Explain the pre initiation complex formation during eukaryotic translation.

### **Multiple Choice Questions:**

#### **1. A nucleoside is composed of**

- a) a base+ a sugar
- b) a base+ a sugar+ phosphate
- c) a base+ a phosphate
- d) none of these

#### **2. Genetic mutation occurs in**

- a) Protein
- b) RNA
- c) DNA
- d) Nucleus

#### **3. DNA is present in**

- a) nucleus only
- b) nucleus, mitochondria and ER
- c) nucleus, mitochondria and chloroplast
- d) nucleus, mitochondria and RER

#### **4. DNA is the genetic material in**

- a) viruses, prokaryote and eukaryote
- b) prokaryote and eukaryote
- c) only in eukaryotes
- d) in some viruses, prokaryotes and eukaryotes

#### **5. The two strands in a DNA double is joined by**

- a) Co-valent bond
- b) Hydrogen bond

- c) ionic bond
- d) phosphodiester bond

**6. Chromatin is composed of**

- a) nucleic acids and protein
- b) nucleic acids only
- c) proteins only
- d) none of these

**7. The basic repeating units of a DNA molecule is**

- a) nucleoside
- b) nucleotide
- c) histones
- d) amino acids

**8. Adjacent nucleotides are joined by**

- a) covalent bond
- b) phosphodiester bond
- c) ionic bond
- d) peptide bond

**9. The length of one turn of DNA is**

- a) 3.4 A°
- b) 34 A°
- c) 20 A°
- d) 3.04 A°

**11. The width of DNA molecule is**

- a) 15 A°
- b) 3.4 A°
- c) 20 A°
- d) 25 A°

**12. The length of DNA having 23 base pairs is**

- a) 78 A°
- b) 78.4 A°
- c) 78.2 A°
- d) 74.8 A°

**13. Left handed DNA**

- a) A-DNA
- b) B-DNA
- c) Z-DNA
- d) C-DNA

**14. Z-DNA have a**

- a) Double helical nature
- b) Zig-Zag appearance
- c) Uracil base
- d) single stranded nature

**15. A short length of DNA molecule has 80 thymine and 80 guanine bases. The total number of nucleotide in the DNA fragment is**

- a) 160
- b) 40
- c) 320
- d) 640

**16. The first X-ray diffraction patterns of DNA were taken in 1938 by \_\_\_\_\_**

- a) William Asbury
- b) Rosalind Franklin
- c) Francis H. Crick
- d) Linus Pauling

**17. In early 1950s high quality X-ray diffraction photographs of DNA suggesting the DNA being double helix and composed of two nucleotide strands. Who took those photographs?**

- a) Rosalind Franklin
- b) William Asbury
- c) Francis H. Crick and James D. Watson
- d) Rosalind Franklin and Maurice Wilkins

**18. In 1952, an unambiguous established work in the laboratory of Alexander Todd led to the discovery of \_\_\_\_\_**

- a) Chemical nature of DNA
- b) X-ray diffraction structure of DNA
- c) 3'-5' phosphodiester linkage regularly links the nucleotides of DNA
- d) Nucleic acid strands are held together by hydrogen bonds

**19. What should be the complementary strand of 3'....ATGGCTTGA....5'?**

- a) 3'....TACCGAACT....5'
- b) 5'....TACCGAACT....3'
- c) 3'....TAGGCAAGT....5'
- d) 5'....TAGGCAAGT....3'

**20. The hydrogen bonds formed during A and T bonding occurs between C6NH2 of A and \_\_\_\_\_**

- a) C4O of T
- b) PO3-
- c) C6O of A
- d) C1O of T