

VCD:

11/12/23Class: **FYBT** Sem: **I** Subject: **Biotechnology**Duration: **2 ½ Hours**Marks: **75****USBT106 - Molecular Biology-I**

1. Attempt all questions.
2. All questions carry equal marks.
3. Draw neat labeled diagrams wherever necessary.
4. For Q 2, Q 3 and Q 4 attempt A and B OR C and D.

Q 1 Do as directed (Any fifteen)**15**

1. The common form of DNA in cells is closest in structure to _____.
a. B- DNA b. C- DNA c. A- DNA d. Z- DNA
2. Define the term 'Karyotype'.
3. In DNA, the pentose sugar is _____.
a. Deoxyribose b. Ribose c. Purine d. Uracil
4. The total amount of DNA in the haploid genome of a species is known as the species' _____.
a. C value b. P value c. Z value d. H value
5. _____ chromosome has the centromere at about the center, so the chromosome appears to have two approximately equal arms.
a. Metacentric b. Acrocentric c. Telocentric d. Submetacentric
6. What are two classes of nitrogenous bases present in DNA?
7. Which enzyme is required to stabilize the separated DNA double stranded structure.
8. Mode of DNA replication in *E. Coli* is:
a) Conservative and unidirectional
b) Semi-conservative and unidirectional
c) Conservative and bidirectional
d) Semi-conservative and bidirectional
9. The unwinding of DNA is done by _____.
a) Helicase b) Ligase
c) Exonuclease d) Topoisomerase
10. The DNA-dependent DNA polymerases catalyze _____.
a) in 3' - 5' direction b) in 5' - 3' direction
c) In both direction d) In neither direction
11. Which phase of the cell cycle does DNA replication occur?
12. What is the significance of telomere maintenance in preserving genomic stability?
13. Eukaryotic DNA replication initiates at a single origin of replication. State whether True or False.
14. In the context of DNA repair, what is the function of the enzyme photolyase?
a. Repairing thymine dimers caused by UV radiation
b. Correcting base-pair mismatches

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- c. Removing damaged nucleotides during replication
d. Initiating homologous recombination processes
15. Mutagens are substances that _____.
a. Promote DNA replication b. Increase the fidelity of DNA synthesis
c. Induce DNA mutations d. Facilitate DNA repair
16. In base excision repair _____ protein first recognise DNA lesion.
a. UVR_A b. UVR_B c. UVR_C d. UVR_D
17. Define point mutation.
18. Define Induced mutation.
19. Mutations can occur spontaneously without any external factors. State whether True or False.
20. Mutations in germ cells can be passed onto offspring, potentially affecting future generations. State whether True or False.
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- Q. 2 A Elaborate the DNA double helix- Watson and Crick's Model. 08
- Q. 2 B What is 'nucleoside'? Draw structure of Cytosine (C) and Thymine (T). 07
- OR**
- Q. 2 C Give details of chromosome banding techniques. (Any TWO) 08
- Q. 2 D Elaborate the packaging of DNA into chromosomes. 07
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- Q. 3 A Elaborate on Initiation of replication in prokaryotes. 08
- Q. 3 B What are DNA polymerases? and give its roles. 07
- OR**
- Q. 3 C Explain the semi-discontinuous replication system in prokaryotes. 08
- Q. 3 D Elaborate on Initiation of replication in eukaryotes. 07
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- Q. 4 A Give an account on different types of point mutations. 08
- Q. 4 B Elaborate on types of Chemical mutagens which induce mutation. 07
- OR**
- Q. 4 C Elaborate on spontaneous mutation. 08
- Q. 4 D Explain Nucleotide excision repair. 07
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- Q. 5 Write Short notes on **any three** of the following 15
- a. Centromeric and Telomeric DNA
 - b. Histone and Non-histone proteins
 - c. Meselson and Stahl experiment
 - d. Photoreversal DNA Repair
 - e. Physical mutagen