(100)

VCD / 02\222-FYBT SEM I MOLECULAR BIOLOGY-I 2 ½ HRS 75 MARKS

N.B:

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. _____, a specific set of sequences at the end of a linear chromosome, stabilizes the chromosome and is required for replication.
   a. Centromere b. Telomere c. Histone d. Ribosome
2. In DNA, 5' to 3' phosphate linkages are called _____.
   a. phosphodiester bond b. glycosidic bond
   c. hydrogen bond d. nitrogen bond
3. _____ 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
4. Define the term 'Genome'?
5. _____ are regions internal to the simple telomeric sequences.
   a. Telomere-associated sequences b. Centromeric sequences,
   c. Centromere DNA elements d. Long interspersed elements
6. What are two classes of nitrogenous bases present in DNA?
7. _____ is a pre-existing polynucleotide chain in DNA replication to which new nucleotides can be added.
   a. primer b. starter c. initiator d. oriC
8. In DNA replication, _____ exonuclease activity is a proofreading mechanism.
   a. 5' to 3' b. 3' to 5' c. 5' to 5' d. 3' to 3'
9. The segments of untwisted single strands upon which the new strands of DNA are made are called the _____ strands.
   a. non - template b. template c. double d. non-sense
10. In DNA replication, the _____ proteins bind to the parental molecule at the origin of replication and wrap the DNA around them.
    a. terminator b. initiator c. SSB d. ligase
11. Primase activated by DNA helicases synthesizes a short _____ required for initiation of DNA synthesis.
    a. RNA primer b. DNA primer c. core protein
    d. exonuclease activity
12. The RNA primers themselves do not remain as a part of the new DNA chain, they are removed and replaced with DNA by the action of _____.
    a. DNA polymerase I b. DNA polymerase II
    c. DNA polymerase III d. RNA polymerase
13. In eukaryotes, the enzyme _____ serves a DNA repair function.
    a. DNA polymerase α b. DNA polymerase β
    c. DNA polymerase γ d. DNA polymerase δ
14. _____ plays an important role in the Mismatch repair mechanism.
    a. MutS b. UvrB c. Photolyase d. UvrC
15. AP endonuclease plays an important role in _____mechanism.
    a. Base Excision Repair b. SOS repair
    c. Nucleotide Excision Repair d. Photoreactivation

16. Photoreactivation occurs when an enzyme called _____ is activated by a photon of light and splits the dimers apart.
a. photolyase b. polymerase c. ligase d. UvrC

17. _____ is the point mutation occurs by substitution of purine by pyrimidine and vice versa.
a. Transversion b. Transition c. Silent d. Missense

18. _____ system involves four proteins—UvrA, UvrB, UvrC, and UvrD
a. NER b. BER c. SOS d. Mismatch

19. Give any TWO examples of viruses with DNA as a genetic material.

20. Give any TWO examples of biological mutagens.

Q. 2 A Elaborate the DNA double helix- Watson and Crick's Model. **08**

Q. 2 B Give details of chromosome banding techniques. (Any TWO) **07**

OR

Q. 2 C Elaborate the packaging of DNA into chromosomes. **08**

Q. 2 D What is 'nucleoside'? Draw structure of Cytosine (C) and Thymine (T). **07**

Q. 3 A Elaborate on the experiment that Meselson and Stahl used to prove the semiconservative mode of replication in prokaryotes. **08**

Q. 3 B Explain why DNA replication as a whole is considered to occur in a semi-discontinuous fashion. **07**

OR

Q. 3 C With a suitable model explain reciprocal recombination in detail. **08**

Q. 3 D In detail explain the initiation of DNA replication in eukaryotes. **07**

Q. 4 A Describe the mechanism of Base Excision Repair. **08**

Q. 4 B Define the term 'Mutation'. Explain following types mutations: **07**
a) Transition mutation, b) Frameshift mutation, c) Silent mutation

OR

Q. 4 C Describe the mechanism of Mismatch repair. **08**

Q. 4 D What are "Mutagens"? Describe action of base analogue with any ONE example. **07**

Q. 5 **Write Short notes on any three of the following** **15**

a. Histone and Non-histone proteins
b. Human Karyotype
c. DNA polymerases in eukaryotes.
d. Enzymes involved in prokaryotic DNA replication.
e. Photoreversal Repair