JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION-2021
B.Tech. VII Semester

COURSE CODE: 18B11BI313   MAX. MARKS: 35

COURSE NAME: Biological Computation

COURSE CREDITS: 04   MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. The connecting point where two adjacent branches join is called a ___.(1 Mark)

Q2. The lines in the phylogenetic tree are called ___. (1 Mark)

Q3. A group of taxa descended from a single common ancestor is defined as a ____group. (1 Mark)

Q4. In a phylogenetic tree, can aparent branch split into two or more daughter branches at any given point?Justify your answer.(2 Mark)

Q5. We can use molecular data to study evolution of a gene. What strategy will you apply to study phylogeny of a species? (3 Marks)

Q6. To use molecular data to reconstruct evolutionary history requires making a number of reasonable assumptions. Discuss some of these assumptions and significance of molecular data in phylogenetics. (3 Marks)

Q7. Calculate the R-transformed values for taxon A and taxon B. Given pairwise distances: AB=10, AC=20, AD=40, BC=30, BD=30, CD=20.(3 Marks)

Q8. Calculate the branch lengths for taxa Aand B in a neighbor joining cluster. Given AB distance=10,r'_A=60, and r'_B=70. (3 Marks)

Q9. Calculate the number of informative sites in the given alignment. (3 Marks)
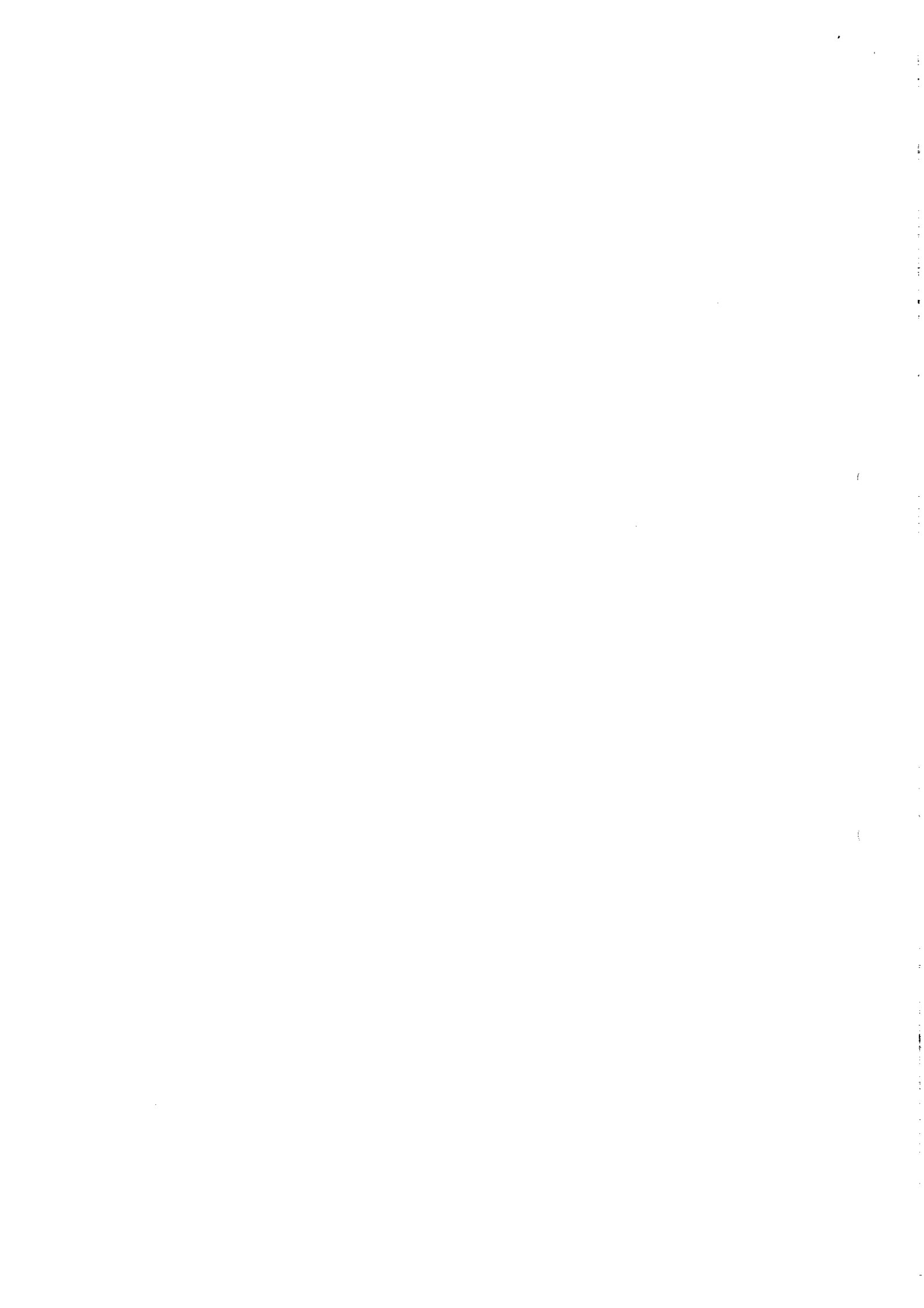
Seq 1 GNYNYKYRYLRHGKLRPFERDISNVPFSPDGKP
Seq 2 GNYNYKYRYLRHGKLRPFERDISNVPFSPDGKP
Seq 3 GNFNYYYRIWRSEKLRPFERDIAHYDYQVGTQF
Seq 4 GNYNYLYRWVRRSKLNPYERDLSNDIYSPGGQS
Seq 5 GNYNYLYRWVRRSKLNPYERDLSNDIYSPGGQS
Seq 6 GNYNYKYRSLRHGKLRPFERDISNVPFSPDGKP
Seq 7 GNYNYLYRLFRKSNLKPFERDISTEIYQAGSTP

Q10. How will you convert the given multiple sequence alignment into a raw frequency table? (5 Marks)

1   ATGTCG
2   AAGACT
3   TACTCA
4   CGGAGG
5   AACCTG

Q11. Build a UPGMA tree for the given pairwise distances? AB=10, AC=20, AD=40, AE=30, BC=30, BD=30, BE=20, CD=20, CE=40, DE=10.(5 Marks)

Q12. Which character will be at the root according to parsimony for the given tree topology?(5 Marks)

G   T   A   T   A   T