BRAC University
Department of Computer Science and Engineering

CSE 443: Bioinformatics-I (A)

Quiz 01: Summer 2025 Time: 20 Minutes Marks: 15

Name		ID		Section	

1. What does the minimum in a skew diagram suggest?
   (a) Point of maximum G content
   (b) Origin of replication
   (c) Transcription termination site
   (d) Random sequence noise
2. Which algorithm starts with one k-mer and builds the motif profile iteratively?
   (a) Gibbs Sampling
   (b) Greedy Motif Search
   (c) Randomized Motif Search
   (d) Naive Exact Search
3. Given the DNA string 'CATTCCGGA', what is the skew at position 5?
4. What is the consensus string for the matrix: A: [2,0,1] C: [1,3,1] G: [0,1,2] T: [1,0,0]?
5. What function quantifies the dissimilarity of motif instances from a consensus?
   (a) Information content
   (b) Likelihood
   (c) Hamming distance
   (d) Entropy
6. Which of the following improves Greedy motif search accuracy?
   (a) Using pseudocounts
   (b) Ignoring reverse complements
   (c) Reducing number of sequences
   (d) Decreasing motif length

7. In a profile matrix, counts at one position are A:2, C:1, G:1, T:0. What is the probability of A (with pseudocounts +1)?

8. Reverse complements are essential for identifying motifs on both DNA strands.[True / False]

9. The sum of all nucleotide probabilities at any position in a profile matrix equals 1. [True / False]

10. Skew diagrams are symmetric with respect to reverse strands.[True / False]

11. The consensus string is always a substring of one of the input sequences.[True / False]

12. What is the profile probability of k-mer 'ATG' given profile: Position 1: A=0.2, C=0.3, G=0.2, T=0.3 Position 2: A=0.3, C=0.2, G=0.3, T=0.2 Position 3: A=0.5, C=0.1, G=0.2, T=0.2?

13. Which of the following is an advantage of Gibbs Sampling?
    (a) Always finds global optimum
    (b) Runs in constant time
    (c) Can escape local optima via randomness
    (d) Requires no initialization

14. The origin of replication is typically located at the first base of the genome.[True/False]

15. Adding pseudocounts reduces the influence of small sample size in profile estimation.[True/False]