1)

t-RNA	A	U	G	C	U	U	A	G	C	U
Template DNA strand	A	T	G	C	T	T	A	G	C	T
Coding DNA strand	T	A	C	G	A	A	T	C	G	A

2) Amino acid is encoded by a set of consecutive bases. The three-base sets in RNA are called codons. Also each 1 amino acid can have more than one corresponding codon but each codon has only 1 matching amino acid.

3)

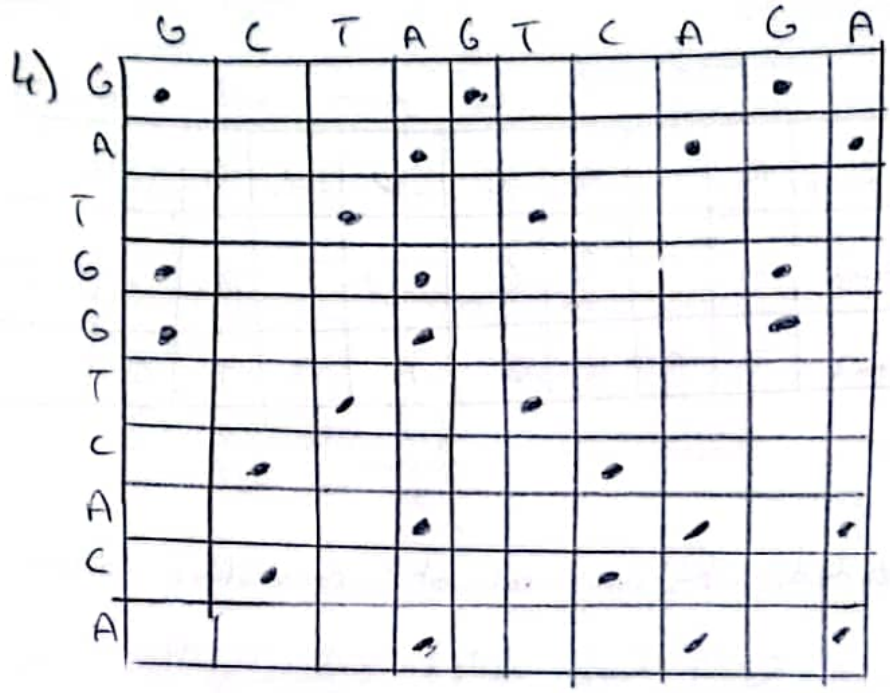
1- Primary structure is the protein sequence, the types and order of the amino acids in the protein chain

2- Secondary structure is the first level of protein folding in which parts of the chain fold to form generic structure that are found in all proteins

3- Tertiary structure is formed by the further folding and packing together of these elements to give the final three dimensional conformation unique to protein

4- Quaternary conformation, the subunit (protein chain) composition and arrangement in such multisubunit proteins

4)



5) A filtering method is used which includes a sliding window. Method uses 2 parameters window size and minimum identity score (stringency) over the window size to consider this window

6)

$$\sum_{k=0}^{\min(10,8)} 2^k \binom{10}{k}\binom{8}{k}$$

$$2^0\binom{10}{0}\binom{8}{0} + \cdots + 2^8\binom{10}{8}\binom{8}{8}$$

$$1 + \cdots + 2^8 \cdot 45 \cdot 1 = 1256445 \text{ alternatives}$$

7)

		G	A	C	T	T	A	C
	0	-2	-4	-6	-8	-10	-12	-14
G	-2	3	1	-1	-3	-5	-7	-9
T	-4	1	2	0	2	0	-2	-4
G	-6	-1	0	1	0	1	-1	-3
A	-8	-3	2	0	0	-1	4	2
A	-10	-5	0	1	-1	-1	2	3
C	-12	-7	-2	3	1	-1	0	5

Optimal Global Alignment

G -- T G A A C

G A C T - T A C