1) The following polynucleotide was synthesized and used as a template for peptide synthesis in E. coli.

.....AUAUAUAUAUAUU......

i) What polypeptide would you expect to produce? Precisely what does this tell you about the code?

ii) What if the same nucleotide sequence was used in a mitochondria derived translation system and encoded the polypeptide: Met-Tyr-Met-Tyr... What does this say about the differences between the mitochondrial and bacterial codes?

2) When polynucleotides are synthesized with repeating triplets of nucleotide residues, two or three kinds of polypeptide chains will be produced.

i) Explain why two different results are possible.

ii) Predict polypeptides produced when the following are used with an E. coli system:

(GUA)n; (UUA)n

3) What are the anticodon sequences for the tRNA molecules which encode:

i) Met

ii) Ile

iii) Ser

4) What enzymes are responsible for tRNA charging? Why must this reaction be specific?

5) Point mutations may result in changes to only one amino acid in a protein. Give examples of point mutants that can lead to more severe disruptions in a protein’s primary structure.

6) The mRNA sequence UUUGAAUGG encodes the triplet sequence Phe-Glu-Trp. What other mRNA sequences encode this triplet? Explain.
7) What is the amino acid sequence of the peptide encoded by the following sequence:

5’-CAUGAUAAUUCUUCACUGUACAAACAUAAAACACUUAACC

a) in prokaryotes?
b) In eukaryotes?

8) a) List the common structural features of tRNA molecules.
    b) How do tRNA molecules differ?