1) What is sigma factor looking for specifically in a eukaryotic promoter region? (Make sure you are reading this question VERY carefully!)

2) Is it a coincidence that promoter regions, such as the -10 site of the *E. coli* promoter, are often rich in A-T base pairs? If not, explain the significance, and describe at least one other region that is also "A-T rich".

3) What steps occur in the processing of a eukaryotic mRNA, and where do these steps occur?

4) Describe the three phases of translation, pointing out differences between bacteria and eukaryotes (and archaea) where relevant.

5) If a wild-type *E. coli* cell makes one mistake during DNA replication, how many mistakes is that same cell likely to make if its DNA polymerases do not proofread?

- How many mistakes would it be likely to make if there were no mismatch repair system?
- What if it was lacking both of them?

6) Describe the relationship between euchromatin and heterochromatin during interphase with regard to gene density, packing density, and timing of replication.