**Problem set 3**

1. State TRUE OR FALSE for the following statements:

(A) Poly-A tailing is a template independent synthesis

(B) 3’ end of nascent eukaryotic mRNA acquires a poly A tail

(C) Splicing removes introns from eukaryotic transcripts

(D) Transcription and translation occurs in same cellular compartment in both eukaryotes and prokaryotes

2. The lac operon is turned ON

(A) In the presence of lactose (B) In the presence of glucose

(C) In the presence of lactose and presence of glucose (D) In the presence of lactose and absence of glucose

3. In lac operon, if you remove the lac operator (the repressor binding site) what will be the effect on the metabolic state of the bacteria?

(A) Lactose metabolizing enzymes will be produced irrespective of the presence or absence of lactose

(B) Glucose metabolism will be hampered

(C) Lactose will never be metabolized because the enzymes will never be synthesized

(D) RNA Polymerase will not be able to bind the promoter

4. What will be the number of amino acids after translation of the following mRNA (hypothetical)?

5’UAA GGA AGC GCU AUG GGG GCG GGC CCU GUG CCC UAA

(Ribosome binding site is highlighted in yellow, Start codon in green, and Stop codon in red)

5. RNA required for protein synthesis is:

(A) mRNA (B) rRNA (C) tRNA (D) all of these

6. Which of the following RNA molecules serves as an adaptor molecule during protein synthesis?

(A) rRNA (B) mRNA (C) tRNA (D) mRNA and tRNA

7. The rate of protein synthesis in prokaryote is limited by the rate of mRNA synthesis. If mRNA synthesis occurs at the rate of 51 nucleotides/sec, then the rate of protein synthesis occurs at:

(A) 12 amino acids/sec (B) 17 amino acids/sec

(C) 25 amino acids/sec (D) 50 amino acids/sec

8. During protein synthesis, peptide bond formation is catalyzed by \_\_\_\_\_\_\_\_\_\_\_\_\_

9. During protein synthesis, tRNA recognizes correct\_\_\_\_\_\_\_\_\_\_\_ of mRNA through its \_\_\_\_\_\_\_\_\_\_\_\_

10. How many chiral centers are there in the amino acids alanine and glycine?

11. In a folded protein, the nonpolar (hydrophobic) amino acids tend to be

(A) hidden inside the protein (B) exposed on the outside of the protein

(C) distributed randomly throughout the protein (D) cannot be predicted

12. You have purified a multi-subunit extracellular protein that has several interchain disulfide bonds. Which of the following chemicals would you add to your purified protein mixture if you wanted to eliminate the disulfide bonds?

(A) NaCl, a salt (B) SDS, an ionic detergent

(C) H2O2, an oxidizing reagent (D) DTT, a reducing agent