

1. What will be the transcript (i.e. RNA) of this gene (gene is highlighted in yellow)?

5' G C T C A G C A T G G C A G T A 3'
3' C G A G T C G T A C C G T C A T 5'

2. Which of the following best describes a promoter:

- a. A specific DNA sequence from where transcription starts
- b. A specific DNA sequence that promotes termination of transcription
- c. A specific DNA sequence to which RNA polymerase binds
- d. An extracellular inducer that controls genes expression

3. RNA required for protein synthesis is:

- a. mRNA
- b. rRNA
- c. tRNA
- d. all of these

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

- a. rRNA
- b. mRNA
- C. tRNA
- d. mRNA and tRNA

5. 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

6. State true and false from the following statements:

- a. Transcription and translation are coupled process in bacteria
- b. 3' end of nascent eukaryotic mRNA acquires a poly A tail
- c. Splicing removes introns from eukaryotic transcripts
- d. Tetracycline inhibits mRNA synthesis in bacteria

7. When the lactose repressor is bound to the lactose operon

- a. lactose but not glucose metabolism occurs
- b. access to the promoter by RNA polymerase is blocked and transcription of the operon does not occur
- c. RNA polymerase binds to the promoter but only lacZ is expressed
- d. the repressor is unable to bind to allolactose

8. Which of the following mutations is most likely to be disruptive to protein synthesis or function? (Explain your answer)

- a. UAU to UAC
- b. UAU to UUU
- c. UAU to UAA
- d. UAU to UUC

9. Which of the following polymerases DOES NOT require a template sequence?

- a. DNA polymerase
- b. RNA polymerase
- c. Taq polymerase
- d. poly-A polymerase

10. 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)

11. State three mechanistic differences between transcription and replication.

12. State three differences between prokaryotic and eukaryotic transcription.