**Problem set 3**

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 G G G C G…………TAA 3’

3’ C G A G T C G T A C C C C C G C………... ATT 5’

**5’G C U C A G C A U G G G G C G…………UAA3’**

2. Why is RNA primer required during DNA replication?

(A) Because RNA is less stable than DNA, hence easy to remove

(B) RNA has extra –OH group at 2’ position

**(C) An existing 3’ –OH group is necessary for DNA polymerase activity**

(D) RNA polymerase can work without a template

3. 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

4. State TRUE OR FALSE for the following statements:

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

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

(C) Splicing removes introns from eukaryotic transcripts **TRUE**

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

5. During transcription, RNA polymerase reads the template DNA strand in:

**(A) 3’to 5’ direction** (B) 5’to 3’ direction

(C) In both directions (D) Does not require a DNA template

6. Which step of RNA processing occurs in eukaryotes but not in prokaryotes? **\_Splicing and Poly-A tailing at 3’ end of nascent mRNA\_.**

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

(A) DNA polymerase (B) RNA polymerase (C) Taq polymerase **(D)Poly-A polymerase**

8. 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**

9. When the lac repressor is bound to the lac operon

(A) Lactose but not glucose metabolism occurs   
**(B) RNA polymerase can't transcribe genes present in lac operon**

(C) RNA polymerase binds to the promoter but only lacZ is expressed   
(D) The repressor is unable to bind to allolactose

10. 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

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