Chapter 25: Transcription and RNA Processing

Matching Or Fill In
Choose the correct answer from the list. Not all the answers will be used.

1)_____ (omit the red questions) Eukaryotic RNA molecules are altered by removal of intervening sequences called _____.

2)_____ An AT-rich region found in eukaryotic promoters is called the _____.

3)_____ The DNA strand that serves as a template during transcription is known as the _____ or noncoding strand.

4)_____ Prokaryotic genetic units called _____ typically contain genes with related functions.

5)_____ Protein-coding genes are also known as _____ genes.

6)_____ Eukaryotic rRNA genes are transcribed and processed in the _____.

7)_____ Termination of bacterial transcription often requires a protein known as _____.

8)_____ The expressed sequences of eukaryotic pre-mRNAs are known as _____.

9)_____ In _____, RNA polymerase does not include a removable sigma factor.

10)_____ GC boxes function analogously to prokaryotic _____.

A) Rho factor
B) introns
C) eukaryotes
D) introns
E) operons
F) structural
G) AUG box
H) promoters
I) antisense
J) exons
K) nucleolus
L) TATA box

Terms not used: D) introns, G) AUG box

Fill In Questions

11) In prokaryotes, RNA polymerase binds to nucleotide sequences known as _____ that are recognized by the corresponding sigma factor.

12) The term rRNA refers to _____ RNA.

13) Transcriptional activators that can have variable positions and orientations are called _____.

14) Most _____ mRNAs have well defined 3′ ends terminating in poly(A) tails of ~ 250 nucleotides.

15) The fact that some eukaryotic rRNAs are self-splicing indicates that RNA can act as an _____.

16) The only known universal transcription factor is _____.

17) All cellular RNAs are transcribed from _____ templates.

Multiple Choice Questions

18) How does the preinitiation complex begin to form at a TATA box–containing promoter?
A) RNAP binds to the sigma factor.
B) RNAP binds to the initiator (Inr) element.
C) TATA-binding protein binds to the TATA box.
D) RNAP binds to the Rho factor.
E) none of the above.

19) Which of the following types of RNA undergo posttranscriptional modifications?
A) mRNA
B) rRNA
C) tRNA
D) all of the above
E) none of the above

20) Why is TBP referred to as a universal transcription factor?
A) TBP suppresses initiation by RNAP I, RNAP II, and RNAP III.
B) A single molecule of TBP initiates transcriptional processes.
C) TBP is present in both prokaryotic and eukaryotic organisms.
D) TBP catalyzes the synthesis of all known transcription factors.
E) TBP is required for initiation by RNAP I, RNAP II, and RNAP III.

21) Which posttranscriptional modification serves to identify the eukaryotic translation start site?
A) poly(A) tail.
B) 5' cap consisting of 7-methylguanosine.
C) intron excision.
D) alternative splicing.
E) exon skipping.

Short Answer Questions
Write your answer in the space provided or on a separate sheet of paper.

22) Describe the transcription bubble formed during the chain elongation stage of RNA synthesis.

23) RNA synthesis is much more error-prone that DNA synthesis. Why is this tolerable?

24) Explain why the pre-mRNAs of many eukaryotic genes are much larger than expected from the known sizes of the proteins they encode.

25) Explain how it is possible for a single gene to encode several proteins that may have significantly different functions.

26) Describe how DNA footprinting techniques can be used to identify promoter regions.