

## BCH 4024 Molecular Biology Section Sample Test Questions

- 1) Which of the following do NOT need a primer in order to function?
  - A) DNA Pol I
  - B) DNA Pol II
  - C) DNA Pol III
  - D) RNA polymerase
  - E) Reverse transcriptase
  
- 2) How many hydrogen bonds form between U and A in a Watson-Crick base pair interactions?
  - A) 0
  - B) 1
  - C) 2
  - D) 3
  - E) 4
  
- 3) Which of the following is activated by adenylation of a lysine residue at the active site?
  - A) DNA Pol I
  - B) ligase
  - C) DNA Pol III
  - D) RNA polymerase
  - E) primase
  
- 4) The only methylated base in mammals is?
  - A) 7-methyl guanine
  - B) none are methylated
  - C) methyl adenine
  - D) 5-methyl cytosine
  - E) deoxythymidine
  
- 5) Which of the following contain zinc fingers (circle all that are correct)?
  - A) DNA Pol II
  - B) transcription factors
  - C) TFIIIA
  - D) TFIID
  - E) Reverse transcriptase
  
- 6) Repressor molecules bind to the:
  - A) promoter
  - B) enhancer
  - C) operator
  - D) alpha subunit
  - E) reverse transcriptase

7) Which of the following enzyme(s) can remove or insert supercoil twists into circular DNA?

- A) Topoisomerases
- B) DNA Pol II
- C) Spliceosomes
- D) Helicase
- E) none of the above

8) Nucleosomes (circle all that apply)

- A) bind to RNA pol II
- B) package eukaryotic DNA
- C) are only present in prokaryotes
- D) are composed on an octamer of histones and ~150 bp of DNA
- E) metabolize lactose

9) To determine the exact 5' - end of an mRNA transcript, one might use which method(s)?

- A) PCR
- B) Primer extension
- C) Cloning
- D) Southern blotting
- E) Ballroom dancing

10) The RNA primer is removed from the Okazaki fragment by:

- A) DNA Pol I
- B) DNA Pol II
- C) DNA Pol III
- D) RNA polymerase
- E) exonuclease

11) Histones have an abundance of which of the following amino acids?

- A) lysine
- B) alanine
- C) arginine
- D) glycine
- E) glutamine

12) Which of the following is not a cloning vector?

- A) helicase
- B) pBR322
- C) SV40
- D) E. coli genomic DNA
- E) EcoRI

13) Which of the following is false about the E. coli Lac operon?

- A) It is polycistronic

- B) In is an example of negative control
  - C) The presence of lactose acts as an inducer
  - D) The repressor binds to the operator
  - E) The mRNA for the repressor binds to the operator
- 14) The trp operon is an example of which type(s) of transcriptional regulation?
- A) Post-translational
  - B) Attenuation
  - C) Methylation
  - D) A repressor which is activated by the presence of the amino acid tryptophan
  - E) None of the above
- 15) The part of the bacterial RNA polymerase responsible for recognizing the promoter is the:
- A) alpha subunit
  - B) rho protein
  - C) DNA Pol III
  - D) sigma subunit
  - E) beta subunit
- 16) Enhancer regions in eukaryotic DNA are (circle all that apply):
- A) DNA Pol I binding sites
  - B) orientation and position independent
  - C) promote transcription
  - D) bind transcription factors
  - E) promote better cloning efficiency
- 17) DNA is replicated:
- A) conservatively
  - B) distributively
  - C) semi-conservatively
  - D) dispersively
  - E) liberally
- 18) DNA ligase does which of the following
- A) joins Okazaki fragments to the high molecular weight DNA chain on the lagging strand
  - B) catalyzes DNA replication
  - C) enhances transcription
  - D) requires dCTP
  - E) methylates DNA
- 19) Eukaryotic DNA polymerase I is specialized to transcribe which of the following?
- A) mRNA
  - B) tRNA
  - C) ribosomal RNA

- D) mitochondrial RNA
- E) none of the above

20) The melting temperature of DNA is the temperature where:

- A) DNA anneals to RNA
- B) DNA denatures into single strands
- C) DNA is degraded
- D) RNA binds to the ribosome
- E) transcription begins