

6. Some proteins end up in the endoplasmic reticulum. Describe how they get there? (4)

7. Assume that the following, running 3' to 5', is the DNA (gene) sequence at the beginning of the coding sequence for a specific mRNA. Give (a) the sequence of the product of transcription and (b) the order of the first five amino acids in the resulting polypeptide.(3)

TACCCGTTACGAGTACAAGGATTGAACAGTCACTGG

8. What is meant by a point mutation? How might a point mutation be also classified as either (a) silent, (b) nonsense, or (c) missense? (4)

9. Describe and/or diagram the try operon. Name and indicate the relative location of the different elements. Describe how changing levels of tryptophan impact its function. (4)
10. What is the difference between repressible and inducible operons? Give an example of each. (2)
11. What is the effect of histone acetylation on chromatin structure? (1)
12. Gene induction in eukaryotes is dependent on distal and proximal control elements. What are these elements? Where are they located? How do they control gene expression? (4)

13. Interphase includes three subphases (G1, G2, and S). In what order do they occur and what distinguishes them from each other? (2)

14. Mitosis includes four subphases. List them in order and indicate at least one event associated with each. (4)

Bonus questions:

(1) Francois Jacob and Jacques Monod received the Nobel Prize in 1965 for what discovery? (1)

(2) Erwin Chargaff, Rosalind Franklin, Francis Crick, James Watson, Marshall Nirenberg, and Har Gobind Khorana were all relatively young when they made their famous contributions to science decades ago. In 2000 all but one was still alive. Today, only one remains alive. Who died first and who will die last? (2)

		Second Position					
		U	C	A	G		
First Position	U	UUU } Phe	UCU } Ser	UAU } Tyr	UGU } Cys	Third Position	U
		UUC } Phe	UCC } Ser	UAC } Tyr	UGC } Cys		C
		UUA } Leu	UCA } Ser	UAA Stop	UGA Stop		A
		UUG } Leu	UCG } Ser	UAG Stop	UGG Trp		G
	C	CUU } Leu	CCU } Pro	CAU } His	CGU } Arg	U	
		CUC } Leu	CCC } Pro	CAC } His	CGC } Arg	C	
		CUA } Leu	CCA } Pro	CAA } Gln	CGA } Arg	A	
		CUG } Leu	CCG } Pro	CAG } Gln	CGG } Arg	G	
	A	AUU } Ile	ACU } Thr	AAU } Asn	AGU } Ser	U	
		AUC } Ile	ACC } Thr	AAC } Asn	AGC } Ser	C	
		AUA } Met	ACA } Thr	AAA } Lys	AGA } Arg	A	
		AUG } Met	ACG } Thr	AAG } Lys	AGG } Arg	G	
	G	GUU } Val	GCU } Ala	GAU } Asp	GGU } Gly	U	
		GUC } Val	GCC } Ala	GAC } Asp	GGC } Gly	C	
		GUA } Val	GCA } Ala	GAA } Glu	GGA } Gly	A	
		GUG } Val	GCG } Ala	GAG } Glu	GGG } Gly	G	