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Biology 150: 4th in-class exami November 19, 2012	ination	Name			
Indicate the lab you are <u>registere</u>	<u>d</u> in:				
<u>Tuesday, 8-9:50</u>	<u>Tuesday, 10-11:50</u>	<u>Tuesday, 12-1:50</u>			
<u>Tuesday, 3-4:50</u>	<u>Tuesday, 5-6:50</u>	<u>Thursday, 3-4:50</u>			

Answer the questions in the space provided and you may also use the back of the page to complete your response. There are 14 questions worth a total of 50 points (plus a couple of bonus questions worth three points total). The point value of individual questions appears in parentheses.

Note: a copy of the genetic code is printed on the last page.

1. The double helix model for the structure of DNA was first described by what two scientists? How did it account for each of the conclusions made by Rosalind Franklin? How did the model make sense of Chargaff's rules? (4)

2. Describe and/or diagram eukaryotic DNA replication. Mention the role of each major enzyme complex (e.g. DNA polymerase I and III, DNA ligase, DNA helicase, topoisomerase, RNA primase, single strand binding proteins), okazaki fragments, and the differences between leading and lagging strand synthesis. (6)

3. Describe eukaryotic transcription. Where does it start? What does it? Where does it end? (3)

4. Describe mRNA processing. These molecules are shortened in the process. What is removed by what? What other changes occur? (4)

5. Describe and/or diagram the events of translation. In what order do the components come together? How is protein amino acid sequence determined? How is translation terminated? (5)

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 chromation 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)

	U	C	С		А		G	
U	UUU 1	UCUJ	Ser	UAU 1	Tyr	UGU]	C	U
	UUC Phe	UCC		UAC J		UGC]	Cys	C
	UUA1.	UCA		UAA	Stop	UGA	Stop	A
	UUG Leu	UCG		UAG	Stop	UGG	Trp	G
C CUU- CUC CUA CUG	CUUJ	CCUJ	Pro	CAU	His	CGUJ	Arg	U
	CUC	CCC		CAC		CGC		C
	CUA Leu	CCA		CAA		CGA		A
	CUG	CCG-		CAG	Gin	CGG-		G
A	AUUJ	ACU		AAU	Acr	AGU	Sor	U
	AUC lle	ACC	Thr	AAC	Ash	AGC -	Joer	C
	AUA	ACA		AAA	1	AGA -	1 4	A
	AUG Met	ACG		AAG	Lys	AGG -	J AIg	C
G	GUUJ	GCU		GAU	Acn	GGU-	1 Salary	L
	GUC	GCC	Ala	GAC J	Asp	GGC	Gly	C
	GUA	GCA		GAA]	Chu	GGA		A
	GUG	GCG-		GAG	Glu	GGG-	J	C