Biol4241 Final Exam: DRAFT QUESTIONS

From the set of *nine* questions below: answer # X, and any six others. Each answer should be about one-half to one page. [Do not answer more than five total]

1. Nirenberg's **poly-UUU experiment** is said to '*prove*' that the Genetic Code is a **triplet** code. Is this true, or not? Explain

2. Show **how many codons** in the **Genetic Code** can be inferred from **RNA poly-monomers** and **poly-dimers** of **RNA**. (Use the code diagrams on the reverse).

3. Identify all DNA triplets that can mutate to the **TGA** Stop triplet in one step. Is there any pattern that might suggest how the Genetic Code evolved? Discuss.

4. For the data at [https://www.mun.ca/biology/scarr/Restriction_Mapping.html], an animation explains the logic of **double-digest restriction mapping** for a 0.8 kbp DNA fragment cut with three restriction endonuclease, ***Eco*RI**, ***Bgl*II**, and ***Mbo*I**.Follow the animation, and complete the map of the restriction sites. Show your work. [You do no need to calculate the exact sizes of the fragments: their relative sizes are sufficient].

5. Popular accounts of automated DNA sequencing (such as Jurassic Park I) often state that "*the sequencer reads the **DNA** sequence with a **laser***". Is this statement true, or false? Explain how a laser is used in an automated **DNA** sequencer.

6. [https://www.mun.ca/biology/scarr/VNTR_fingerprinting_for_parentage.html] shows a **DNA fingerprint** for the following scenario. Two parents (**##1 & 2**) with missing children ask whether any of six children (**A - F**) of the correct age could be the children of one or both of them. ***For each of the children, determine whether they could be the offspring of*** (**1**) #1 only, (**2**) #2 only, (**3**) both #1 *and* #2, (**4**) neither #1 *nor* #2. Explain each determination in detail. For a match of type (**3**), is the identification certain? Why or why not?

7. Question 7

8. Question 8

9. Question 9

1st	2nd U	2nd C	2nd A	2nd G	3rd
U	F	S	Y	C	U
	F	S	Y	C	C
	L	S	*	*	A
	L	S	*	W	G
C	L	P	H	R	U
	L	P	H	R	C
	L	P	Q	R	A
	L	P	Q	R	G
A	I	T	N	S	U
	I	T	N	S	C
	I	T	K	R	A
	M	T	K	R	G
G	V	A	D	G	U
	V	A	D	G	C
	V	A	E	G	A
	V	A	E	G	G

1st	2nd U	2nd C	2nd A	2nd G	3rd
U					U
					C
					A
					G
C					U
					C
					A
					G
A					U
					C
					A
					G
G					U
					C
					A
					G

In conjunction with the complete table of the **Genetic Code** [left], use this blank table [right] to identify the **Codons** whose coding properties can be inferred from Nirenberg & Khorana's **poly-monomer** ex.: **UUUUUUUUU** and **poly-dimer** ex.: **CG**CG**CG**CG**CG** experiments