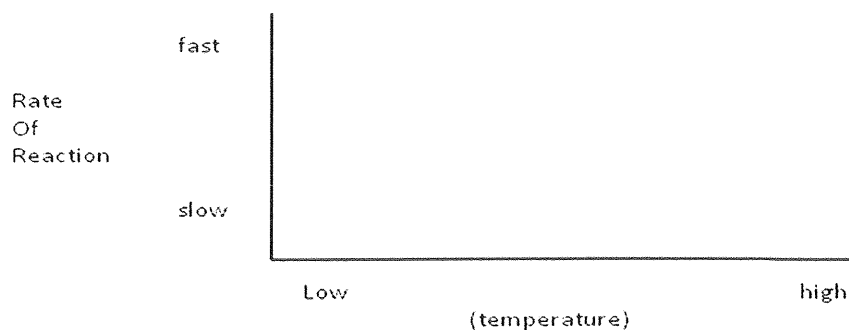


16. In an experiment involving unlinked genes, you cross AaBbCcDd with AaBbCcDd. What proportion of the progeny would be expected to: (3)
- be heterozygous for all traits?
 - show the dominant phenotype of all traits?
 - show the dominant phenotype of all traits?
17. You work in a lab which studies fruit fly inheritance. You cross a fly without bristles and stubby wings with a fly that has normal bristles and wings. All the progeny have normal bristles and wings. Crossing these progeny, however, results in flies of which most are an approximately 3:1 mix of entirely normal flies to flies with both no bristles and stubby wings except there are also a small number of flies with either normal wings and no bristles or flies with stubby wings and normal bristles.
- What do these results suggest to you about dominance and loci location? (2)
 - You look again at your F2 progeny and observe that all the flies with both stubby wings and without bristles are male. What does this tell you? (2)
 - What sex were “the small number of flies with either normal wings and no bristles or flies with stubby wings and normal bristles”? (1)
 - Of the original parent flies, male or female, which was the mutant? (1)
 - You do one more experiment. You cross an F2 male with both stubby wings and without bristles and an F2 female. In the resulting progeny 8 have either both normal wings and bristles, 8 have both stubby wings and no bristles, 2 have normal wings and no bristles and 2 have stubby wings and normal bristles. What does this tell you? (3)
18. Name in order the four steps to the scientific method. (1)
19. For what were Barry Marshall and Robin Warren awarded the Nobel Prize? (1)

20. Charles Darwin saw in nature three processes that explained the evolutionary change. Name (or describe) all three. (3)
21. How many bonds does C form? (1)
22. The weak attractions that occur between the O end of one individual water molecule and the H end(s) of another water molecule are called _____ (1).
23. These same attractions occur between water and what other kinds of molecules? (1)
24. Molecules that contain only non-polar covalent bonds and don't dissolve easily in water and are described as _____. (1)
25. Phospholipids and detergent molecules are examples of molecules said to be _____ as they contain both regions containing only non-polar bonds as well as regions contain polar or ionic bonds. (1)
26. Name one hexose aldose. (1)
27. Name one disaccharide. (1)
28. How do amylose and cellulose differ? (2)
29. DNA is a antiparallel. Explain. What is found at either end of each strand? (2)
30. RNA is single stranded and contains ribose. How else does it differ from DNA? (1)

31. If the Bacteria and the Archaea constitute the Prokaryotes, what term describes plants, animals, fungi, and the protists? (1)
32. The semi-fluid contents of cells can variously be described. _____ refers to everything inside the cell membrane, _____ refers to everything inside the cell except the nucleus, while _____ refers to the cell contents surrounding but not including the various organelles. (3)
33. The term organelle is sometimes used to describe any structure or particle inside a cell but, strictly speaking, an organelle is defined as _____. (1)
34. Describe/diagram the structure of the nuclear envelope. Describe or illustrate how molecules move in and out of the nucleus. (3)
35. What is the nucleolus? What happens there? (1)
36. You breathe to provide O₂ to what organelles? (1)
37. Chloroplasts, amyloplasts, and chromoplasts are collectively referred to as _____. While chloroplasts do photosynthesis, and chromoplast contain pigments, amyloplasts store _____. (2)
38. Graph the general response of enzyme activity to temperature.(2)



39. Distinguish between competitive and non-competitive enzyme inhibition. Which of these is a form of allosteric regulation? What is meant by allosteric regulation? (3)
40. What is meant by “coupled reactions”? (1)
41. Distinguish between anabolism and catabolism. (2)
42. Diagram glycolysis indicating the starting fuel molecule, the involvement of energy carrier molecules the names and relative numbers of two intermediate molecules and the final product(s). Give an accounting of the harvested energy. (5)
43. DNA replication in eukaryotes begins when regulatory molecules (i.e. DNA binding proteins) bind at several points along each chromosome called _____. Binding of these DNA binding proteins allows an enzyme that separates the strands called _____ to bind. Tension produced by separating the strands is relieved by the enzyme _____. Separated strands are stabilized and kept apart by _____. The new daughter strands produced by replication are designated by different names. The strand formed following the separating strands is called the _____ strand. The strand formed in a "backstitch" pattern, bit by bit, away from the separating strands is called the _____ strand. Actual DNA synthesis can only occur after an enzyme called _____ first synthesizes 10 base

RNA segments called a _____. The blunt ends of these RNA segments allows an enzyme complex called _____ to bind and synthesize DNA always travelling in the _____ direction along the template strand of the DNA. The new DNA of the “backstitched” strand is synthesized as 1000-2000 base stretches called _____. Later an enzyme called _____ replaces the short stretches of RNA with DNA and an enzyme called _____ connects the sections of DNA together. (13)

44. Assume the following base sequence represents one end of a mRNA (shown 5' to 3'):

methyl-GGAAGGAGGUAACACAUGCCUCCUUAACUGCGGAGGAUAAA....

- list the first 3 amino acids that would appear in the resulting peptide. *Hint: where does transcription start?* (1)
- list the anti-codons, in order, of the first 3 tRNAs involved in the synthesis of that peptide (1)
- list the base sequence of the template strand of the gene. (1)

45. What is a frameshift mutation? What kind(s) of DNA changes produce these types of mutations?(1)

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