

Biology 1A - Lab Exam #1 - July 26th, 2007
Answers Exam 1 Bio 1A, Summer 2007

1	B	6	C	11	A	16	C	21	D	26	B
2	E	7	E	12	E	17	C	22	B	27	E
3	D	8	B	13	E	18	A	23	B	28	D
4	B	9	A	14	E	19	B	24	C	29	B
5	A	10	D	15	C	20	E	25	D	30	

Mean = 60.75, STDEV = 13.3. A (some form) 70-100, B (some form) 59-69, C (some form) 47-58, D (some form) 39-46, F X < 39. Short answers are on the back.

- 2) From the curve you determine the original conc. Is 50 mM, too dilute to make a 100 mM unless boil away, etc. Units matter!
- 5) 1N = 2, 2N = 4. For mitosis 4 chromosomes with sister chromatids line up. No 1N cell in animals undergo mitosis.
- 6) In portion 3 additional enzyme does not change the O.D. which means all S converted to P in the time course of the experiment (substrate is limiting, enzymes are idle).
- 8) You don't change the ploidy but instead change the amount of DNA, C value increases.
- 9) $G2 = 4C$ and zygote = $2C$. Determine #bp for 4.8×10^{-11} grams. 4.8×10^{-11} grams / 6.0×10^2 g/mole bp = 0.8×10^{-13} moles $\times 6.0 \times 10^{23}$ (Avogadro's #) = 4.8×10^{10} .
- 10) Note units, 400 cells/ul there need to do 1:4 dilution and then 2 serial dilutions of 1:10.
- 12) Isoenzymes catalyze the same reaction but they don't have the same primary sequence because if they did they would be the same enzyme, not isoenzyme.
- 13) Double crossover events between d&e yield a gamete that looks like a parental, should be large number.
- 19) From A you know it is linear. All the bands have the same amount of DNA. D must be smaller than B.
- 20) Genes versus alleles. In a diploid individual there are 2 alleles per gene (genetic locus).
- 23) Membranes are hydrophobic, everything is pretty much hydrophilic. Like dissolves like. From lab you know that the more hydrophobic the compound the farther it migrates.
- 25) Since Alice had a child with disease K you know she must be heterozygous. A heterozygote crossed with a hetero yields a genotypic ratio of 1:2:1 (phenotypic ratio 3:1) but you know Tony isn't homo recessive so there is a 2/3 chance Tony is heterozygous. Only 1/4 of the hetero w/hetero display the recessive phenotype. $2/3 \times 1/4 = 2/12$.
- 26) Since there is complementation the alleles must be in different genes.
- 27) dATP has no 2'OH (ribose does) and a 3' OH.
- 28) 6 base pair cutter.
- 29) Different genetic loci implies a heterozygote should be wild type.

Short Answer

2. a) 256 ($1/(1/4 \times 1/4 \times 1/4 \times 1/4)$) b) 256 ($1/(1/4 \times 1/4 \times 1/4 \times 1/4)$) c) 128 1/2 the size of 256, $1/(1/256 + 1/256)$.

3. a) 1/2 b) 1/4 Color is sex-linked, allergenicity is autosomal.

B+ = white, B = black. ha+ = allergenic, ha = non-allergenic.

#3	χ^{B+}	Y		ha	ha+	ha	#4	0.4 DE+	0.4 D+E	0.1 DE	0.1 D+E+
χ^{B+}	χ^{B+} White	White		ha	ha+	ha	0.4 DE	No	No	No	No
χ^B	χ^{B+} Black	Black		ha+	ha+	ha+	0.4 D+E+	No	Yes = 0.16	No	No
							0.1 D+E	No	Yes = 0.04	No	Yes = 0.01
							0.1 DE+		No	No	No

Note 1/2 = black, 1/2 = white. For allergenicity 3/4 induce it, 1/4 do not.

4. 1/2 X 0.21. 1 pt for 1/2, 1 pt for multiplication and 2 pts for 0.21. See the box, upper right.

5. **Template** = 5'---CGTACGTACGTACGT**GTC**- 3', **Radioactive primer** = 3'-CAG- 5'

Each lane = 1 pt.

