

4. The heavy metal mercuric chloride (HgCl_2) will be used to poison the control prep so that it can be used as a blank for spectrophotometry. If the MW of HgCl_2 is 271.5 g/mole, what mass of HgCl_2 is needed to make 85 ml of 0.2 M HgCl_2 ? (5 pt)

5. The buffer used in this lab is made from two reagents: citric acid monohydrate (MW = 192.1 g/mole) and disodium phosphate (MW = 142.0 g/mole). The two are mixed in different volumetric combinations to achieve the desired pH's. Typically, we need twice as much disodium phosphate solution as we do citric acid to prepare the suite of pH buffers. For a class of 96 students, we need 2 L of 0.1 M citric acid monohydrate and 4 L of 0.2 M disodium phosphate. Calculate the mass (g) of each reagent needed to prepare these volumes and concentrations. (5 pt)

6. For some reagents or assay components (e.g., the enzyme extract and buffer), it is difficult to report a specific working concentration - i.e., the actual concentration in the assay after dilution by all of the other components - because of the way they are prepared. For HgCl_2 and the artificial substrate, amylose-azure, however, we can. Suppose the total volume of an assay mixture is 6 ml, what would be the working concentrations of HgCl_2 and amylose-azure in the assay mixture? Report in the units used for each reagent in the lab protocol. (5 pt)

NAME: _____ Lab: M Tu₈₋₁₁ Tu₁₋₄

Prelab Question Set #2: Photosynthesis Lab

TO BE DONE INDIVIDUALLY - MUST SHOW ALL WORK FOR FULL CREDIT

1. We need 1.8 L of 0.35 M NaCl. Starting with a 0.9 M NaCl stock solution we just happen have leftover from an earlier lab prep (we're always looking for ways to keep your tuition bill down), what volume of this stock is needed to prepare this? What volume of deionized water? (4 pt)
2. We similarly need 450 ml of 0.02 M Tris (*Tris [hydroxymethyl] aminomethane*) buffer. We have 20 ml of 0.5 M Tris stock solution on hand. Determine whether or not this is a sufficient volume from which to prepare the 450 ml of 0.02 M Tris we need for lab. (4 pt)
3. To mix up the 4×10^{-4} M DCMU (*3-(3,4-dichlorophenyl)-1,1-dimethylurea*) stock needed for lab, we typically prepare a 100X stock solution that can be frozen (-4°C) and used for multiple years. Given that the formula weight of DCMU is 233.1 g/mole:

4. Some reagents must be prepared fresh for each use. DCIP (2,6-dichlorophenolindophenol sodium salt; FW= 290.1 g/mole), the dye we use in this experiment, is one such reagent, and has a shelf life of about 1 day. What mass of DCIP is needed to prepare enough 4×10^{-4} M DCIP to give each of 32 groups a 10 ml aliquot (the 10 ml includes the extra to cover errors)? (4 pt)

5. Ammonia (as ammonium hydroxide, NH_4OH) will be used in this experiment to uncouple electron transport from ATP synthesis. We keep a concentrated (1.0 N; "N" = normality) stock on hand. What is the minimum volume of 1.0 N NH_4OH stock needed to provide one 1.2 ml aliquot of 10^{-2} N NH_4OH to each of 32 lab groups? (4 pt)

6. You conduct a preliminary test of your chloroplast extract and find that it reduces the available DCIP completely within 4 minutes. If you want to increase the time course of the reaction to make the total reduction of DCIP take at least 12-14 minutes without changing the physical conditions (temp and pressure), what must you do? (2 pt)

NAME: _____ Lab: M Tu₈₋₁₁ Tu₁₋₄

Prelab Question Set #3: Transduction Lab (30 pt)

TO BE DONE INDIVIDUALLY - MUST SHOW ALL WORK FOR FULL CREDIT

1. The recipe for making a 50 ml 3% agarose gel is given in your lab manual on page 105. Using the same components, calculate the amounts of each you would need to make agarose gels of the following densities: (9 pt)

Component	0.4%	0.9%	1.7%
20X TBE (stock)	ml		
Agarose (dry reagent)	g		
Deionized water	ml		
TOTAL VOLUME	50 ml	50 ml	50 ml

2. Routinely used, stable reagents such as TBE (*tris-borate-EDTA buffer*), are often prepared in highly concentrated solutions for ease of storage in the lab and then diluted to working strength (usually 1x) when used.

(a) In the recipe for a 3% agarose gel, what is the working concentration of TBE in "X" units? (3 pt)

(b) Suppose the working concentration of given reagent is 4×10^{-4} M in a standard assay. What would be the molar concentration of a 50X stock solution? (3 pt)

3. A basic component of TBE is EDTA (*ethylene diamine tetraacetic acid*). To make up TBE for this lab, we need first to prepare 350 ml of 0.5 M EDTA. The formula weight (MW) of EDTA is 292.2 g/mole. Calculate the mass of EDTA dry reagent needed to prep this. (4 pt)
4. Calculate the volume of 0.5 M EDTA needed to make 150 ml of 0.3 M EDTA. (4 pt)

5. In a simple 1:13 dilution scheme, what volume of the stock solution would be used to make up 675 ml of working solution? (4 pt)

6. Fill in the missing values of the following serial dilution scheme: (3 pt)

(a) _____ (b) _____ (c) _____

