
	SKILLS CENTER MODULE MASTERY TASK ANSWER SHEET	A BIOFIZZ  PRODUCTON
Name: Minami Hamelitz- Urena	Module: Buffer and stock solutions	Student ID: XXXXXXXXXX
Date: 05/28/2024		Class: MCDB 1234/3456

NOTES:

- You must use this form to submit your MMT as a word doc.
- Paste images, screen shots etc, from your MMT into this document
- Include Module title from the website
- In the space below, please copy/paste EACH MMT question and complete each prompt in full sentences with clean and clearly labelled data.
- Do not attach any data or responses that are not directly relevant to answering each individual MMT
- Please make sure to follow the [rubric](#) guidelines. **Univeral module prompts** (those that are general to all modules) are indicated in bold font.
- Conclusions are required for EACH MMT. Please summarize the data used to draw conclusions. Discuss how the findings can be applied or relate to real-life scenarios. Clearly address the hypothesis, including discussing any sources of errors that might have influenced the results.

MMT QUESTIONS/ANSWERS

Planning/Organization

1. Create a table showing the quantities (volume/ weight) of every component of each buffer on the MMT questions.
2. Use the table to make the buffer by using the pH scale, digital scale, and graduated cylinder.
3. Store all buffers in a 50ml conical tube, label them with my name, date, and buffer component.

Materials and Methods)

Deionized water, solid buffer salts, NaOH solution, HCL solution, graduated cylinders, digital scale, and pH meter

This task will test your ability to make several standard laboratory buffers with the correct pH.

1. Create a table showing the quantities (volume/ weight) of every component of the following buffers

Buffer 1. 50 mL of 0.2M K₂HPO₄, 100mM NaCl, pH 7.9

Buffer 2. 25 mL of 0.1M TRIS, 50 mM NaCl, pH 8.1

Buffer 3. 40 mL of 0.1M HEPES, 80mM NaCl, 1% glycerol, pH 7.4

Buffer 4. 50 ml of 0.1 M Sodium Phosphate buffer, pH 7.0 made from stock 0.1M NaH₂PO₄ and 0.1M Na₂HPO₄ solutions using Table 1.

Make each of the buffers listed above and store in a 50 mL conical tube, label them with your name, date and the buffer components. Paste a table Provide a listing the components and the various amounts in each buffer. Once you submit your MMT with your table of calculated components a proctor will test your buffers.

Gole: 0.1M NaCl in 50ml Buffer 1

$$\frac{0.1 \text{ mol}}{1} \cdot \frac{58.44 \text{ g}}{1 \text{ mol}} \cdot \frac{0.05 \cancel{\text{L}}}{1} = 0.2922 \text{ g} \quad \text{pH 7.9}$$

Gole 0.2M K₂HPO₄ in 50ml

$$\frac{0.2 \text{ mol}}{1} \cdot \frac{174.2 \text{ g}}{1 \text{ mol}} \cdot \frac{0.05 \cancel{\text{L}}}{1} = 1.742 \text{ g}$$

Gole: TRIS 0.1M in 25ml Buffer 2

$$\frac{0.1 \text{ mol}}{1} \cdot \frac{12.1 \text{ g}}{1 \text{ mol}} \cdot \frac{0.025 \cancel{\text{L}}}{1} = 0.03275 \text{ g} \quad \text{pH 8.1}$$

Gole: 0.05M NaCl in 25ml

$$\frac{0.05 \text{ mol}}{1} \cdot \frac{58.44 \text{ g}}{1 \text{ mol}} \cdot \frac{0.025 \cancel{\text{L}}}{1} = 0.07305 \text{ g}$$

Gole: 0.1M HEPES in 40ml Buffer 3

$$\frac{0.1 \text{ mol}}{1} \cdot \frac{238.3 \text{ g}}{1 \text{ mol}} \cdot \frac{0.04 \cancel{\text{L}}}{1} = 0.9532 \text{ g} \quad \text{pH 7.4}$$

Gole: 0.08M NaCl in 40ml

$$\frac{0.08 \text{ mol}}{1} \cdot \frac{58.44 \text{ g}}{1 \text{ mol}} \cdot \frac{0.04 \cancel{\text{L}}}{1} = 0.187008 \text{ g}$$

Gole: 1% glycerol in 40ml

$$\frac{40 \text{ ml}}{1} \cdot \frac{1}{100} = 0.4 \text{ ml} \quad 0.4 \text{ ml} \cdot \frac{1.26 \text{ g}}{1 \text{ ml}} = 0.504 \text{ g}$$

Goal: 0.1 M NaH_2PO_4 in 50ml
 0.1 M Na_2HPO_4 in 50ml
 pH 7.0

Na_2HPO_4 $57.7\text{ml} \div 2 = 28.85\text{ ml}$
 NaH_2PO_4 $42.3\text{ml} \div 2 = 21.15\text{ ml}$

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1		Component	Amount																		
2	Buffer 1	NaCl	0.2922g																		
3		K_2HPO_4	1.742g																		
4	Buffer2	TRIS	0.03275g																		
5		NaCl	0.07305g																		
6	BUffer3	HEPES	0.9532g																		
7		NaCl	0.187008g																		
8		Glycerol	0.4ml																		
9	Buffer4	NaH_2PO_4	28.85ml																		
10		Na_2HPO_4	21.15ml																		
11																					
12																					
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Conclusion

The purpose of this module is to understand the buffer's role and calibrate the pH meter. In preparation, I calculated the component of the buffers. To calculate these substances' quantities, it is important to understand molar weight, molarity, and unit conversion. Also, even though you mixed substances as you just calculated, it may not go to be the exact pH you want. To solve this problem, you need to make sure that you have calibrated and standardized the pH meter before using it. Also, to adjust the pH of the buffer, you are going to put either acid(HCL) or base(NaCl) drop by drop. It is important to understand how to use the equipment to make buffer.