Tutorial 4

312BCH

Q9: Below is a table prepared by a biochemistry student to construct a standard curve for protein analysis. The Bradford assay was used with bovine serum albumin (BSA , 0.1mg/ml ), as standard protein . Complete the table by filling in the weight of BSA in each tube and the approximate A595 that will be obtained for each tub. Assume the procedure was conducted correctly.

**Table1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Reagents | 1 | 2 | 3 | 4 | 5 | 6 |
| H2O (ml) | 1.0 | 0.9 | 0.8 | 0.6 | 0.2 | ------ |
| BSA volume (ml) | ----- | 0.1 | 0.2 | 0.4 | 0.8 | 1.0 |
| BSA weight (μg) | 0.0 | ? | ? | ? | ? | ? |
| Bradford reagent (ml) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| A595 |  | 0.08 | ? | ? | ? | ? |

Q10: Prepare a linear dilution table similar to that in table 1 , Assume that the stock solution is 2.0 M and you require 20ml diluted samples of the final concentration 1.66M , 1.33M , 1.0M , 0.66M , 0.33M , 0.00M.

**Table 2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Reagents | 1 | 2 | 3 | 4 | 5 | 6 |
| Stock 2.0M | ? | ? | ? | 6.66 | ? | 0.0 |
| H2O (ml) | ? | ? | ? | 13.34 | ? | 20 |
| Concentration ( M) | 1.66 | 1.33 | 1.0 | 0.66 | 0.33 | 0.0 |

Q11: Describe how you would prepare a 1 L of the following buffer 0.025M formic acid/ sodium formate buffer , pH = 4.0 ,containing 0.05M glucose ,

Q12: Calculate the pka, kb and pkb of the following weak acids:

1. CH3COOH ka = 1.8 x 10-5
2. Ammonium ion ka = 5.7 x 10-10

Q13: 4.9g of CH3COOK is dissolved in 125cm3 of 1M CH3COOH and the solution was made up to 250ml, pKa = 4.7.

1. Calculate the pH of the final solution.
2. Molarity of the buffer

Q14: The Ka of a weak acid HA, is 3 x 10-4. Calculate

a) The hydroxyl ion concentration in the solution

b) The degree of dissociation of the acid in a 0.15M solution.

Q15: How many ml of 0.1M KOH are required to titrate completely 270ml of 0.4M

propionic acid?

Q16: 200ml of 0.2M NaOH was mixed with 800ml of 0.1M HCOOH. Calculate the pH of the resulting solution. pKa = 3.75.

Q17: In the following reaction :

A+ B 2C + D .

If [A] = 2.1 x10-3  M , [B] = 3.4 x10-2 M ,

[D] = 1.8 x10-3 M , Keq = 6.23 x10-6  Calculate the concentration of [C ].

Q18: Calculate the volume of solution X that has a weight of 22g , and a

density = 1.62 g/ml .

Q19: Calculate the osmolarity of a solution prepared by dissolving 10g of CaCl2 ,and 3g ofsucrose in distilled water to a total volume of 500ml and comment whether it is suitable as a suspension solution for RBC ?

Q20 : A solution of HCl which is w/w 36% , ρ = 1.18 . Calculate

its , Molarity , Normality , Molality .