**Q1:** **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.**

**Q2:** **4.9g of CH3COOK is dissolved in 125cm3 of 1M CH3COOH and the solution was made up to 250ml, pKa=4.7.**

**a)** Calculate the pH of the final solution.

**b)** Molarity of the buffer

**Q3:** **Describe the preparation of 40 L of 0.02M of phosphate buffer, pH 6.9 starting from:**

 **a)** 2M H3PO4 solution and a 1M KOH solution.

 **b)** Solid KH2PO4 and K2HPO4

**c)** Solid Na3PO4 and 1M HCl.

**Q4: An enzyme –catalyzed reaction was carried out in a solution containing 0.2M Tris buffer. The pH of the reaction mixture at the start was 7.8. As a result of the reaction, 0.03mole/liter of H+ was produced. (pKa of Tris = 8.1)**

**a)** What was the ratio of Tris + (conjugate acid) / Tris0 (conjugate base) at the start of the reaction**?**

**b)** What are the concentrations of Tris + and Tris0 at the start of the reaction**?**

**c)** Write the chemical equation showing how the Tris buffer maintained a near constant pH.

**d)** What are the concentrations of Tris + and Tris0 at the end of the reaction**?**

**e)** What was the final pH of the reaction mixture?

**f)** What would the final pH be if no buffer were present?

**Q5:** **What volume of glacial acetic acid (density 1.06g/ml ) and what weight of solid potassium acetate are required to prepare 5L of 0.2M acetate buffer, pH = 5.0 ?.**

**Q6:** **Blood plasma at pH 7.4 contains 2.4 x 10-2 M HCO3- and 1.2 x 10-3 CO2. Calculate the pH after the addition of 3.2 x 10-3 M H+  . Assume that the concentration of dissolved CO2 is maintained constant at 1.2 x 10-3 M by the release of excess CO2?**

**Q7:** **Design a shortcut method for preparing a 0.5M Phosphate buffer, pH = 7.0, where only one form of phosphate is provided?**