Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III(Env. Engg.)Examination December 2009

Subject code: 131301

Subject Name: Environmental Sciences-I

Date: 17 /12 /2009 **Time: 11.00 am- 1.30 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Give five characteristics of primary standards and write the procedure for standardization of 0.01M EDTA solution. **07**

(b) Give the difference between volumetric and gravimetric analysis. **07**

Q.2 **(a)** What is turbidity? Write a short note on Jackson candle turbidity meter. **07**

(b) Write a short note on conductivity meter with figure. **07**

OR

(b) Write a short note on application of pH data in environmental engineering field and determine the pH of following solutions. **07**

(i) 0.02 N HCl (ii)0.02 N H_2SO_4

(iii) 0.02 M HCl (iv)0.02 M H_2SO_4

Q.3 **(a)** What is hardness? Write the procedure for determination of calcium and magnesium hardness from water. **07**

(b) Write a short note on Zeolite method for removal of hardness with chemical reactions. **07**

OR

Q.3 **(a)** Write short note on application of standard methods for water and wastewater analysis. **07**

(b) Give the difference between accuracy & precision with appropriate example. **07**

Q.4 **(a)** Write the available capacity and uses of following glass wares: **07**
(i)Separating funnel (ii)Distillation flask (iii)Neselar tube (iv)Durhamtube (v)Funnel (vi)Mohr's pipette(vii)Desiccators

(b) Write the procedure for analysis of alum. **07**

OR

Q.4 **(a)** Determine the amount of chemical power/concentrated solution required for preparation of following reagents. **14**

(i) 250 ml 0.01M EDTA

(ii) 500 ml 0.1 N H_2SO_4

(iii)1000 ml 0.1 M HCl

(iv)750 ml 0.25 N $K_2Cr_2O_7$

(v) 2000 ml 0.25 N FAS

(vi)250 ml 0.1 M KCl

(vii) 500 ml 0.0282 N $AgNO_3$

Q.5 **(a)** At 20 ^{0}C, two balloons of equal volume and porosity are filled to a pressure of 2 atmosphere ,one with 14 Kg of N_2 and other with 1 Kg of H_2. The N_2 balloon leaks to a pressure of 0.5 atmo. in 1 hr. how long will take H_2 balloon to reach a pressure of 0.5 atmosphere? **07**

(b) A metal plating waste contains 20 mg/l Ca^{+2} and it is desired to add $Ca(OH)_2$ to precipitate all but 0.5 mg/l. To what concentration in moles/liter must the hydroxide concentration be raised to accomplish this? **07**

OR

Q.5 **(a)** Write a short note on activity coefficient **07**

(b) The solubility product Ksp for Calcium Sulphate in water at 25 ^{0}C is 1.96 x 10 $^{-4}$. Determine the equilibrium Ca^{+2} concentrations for a saturated calcium sulfate solution in mg/l if ideal behavior is assumed. **07**

****