(Write your Roll No. immediately) Roll No.....

First Term Examination

First Semester (B.Tech) **Sep-2008**
Paper Code : ETCH-105 Subject: Eng Chemistry
Time: 1hr30min Max Marks: 30

Note: Attempt any three question. Q No.1 is compulsory

Q1 (a) What is role of buffer solution in EDTA titration? (2)
(b) What is break point of chlorination? (2)
(c) What is phenolphthalein and methyl orange alkalinity. Explain with equation. (2)
(d) Standard enthalpy of neutralization for acetic acid and sodium hydroxide is -51.63KJ/mol. Explain. (2)
(e) Methane diffuses faster than oxygen. Give reason. (2)

Q2 (a) Calculate the amount of lime and soda required for softening a million liters of hard water which analysed as follow: (5)
$Ca(HCO_3)_2$ = 243mg/l, $Mg(HCO_3)_2$ = 73 mg/l, $CaSO_4$ = 102 mg/l, $MgCl_2$ = 95 mg/l, NaCl= 500mg/l, $FeSO_4$=139mg/l.
Purity of lime is 94% and soda is 86%.
(b) What are the factors that leads to caustic embrittlement in boilers? How this can be Prevented? (3)
(c) Explain with example enthalpy of hydration. (2)

Q3 (a) Derive Kirchoff's equation. What form it takes if the temperature difference is too large? (5)
(b) When hydrogen gas is burnt in oxygen at 27°C and at constant volume the heat liberated is 240.5 KJ/mole. Calculate the maximum temperature of explosion. Given $C_v(H_2O(g))$ = 24.5 J/K/mole. (5)

Q4 (a) Deduce the following laws from kinetic gas equation: (5)
i) Boyle's Law
ii) Graham's Law
(b) A gas has a density of 1.2504 kg/m^3 at 0°C and a pressure of 1atm. Calculate: (5)
i) The root mean square velocity.
ii) Average velocity of gas molecule.