V.P. AND R.P.T.P. SCIENCE COLLEGE, VALLABHVIDYANAGAR
B.Sc. (SEMESTER-III) EXAMINATION
INTERNAL TEST - 2014
Saturday, 11th October

2.00 pm to 3.30 pm

PHYSICAL CHEMISTRY: US03CCHE02

Marks-25

Q -1. Choose the one alternative that best completes the statement or answers the question. (03)

(i). Which of the following is always true for an isothermal process of an ideal gas?

(a) the pressure does not change   (b)no heat flows into or out of the system

(c) the internal energy does not change (d) the volume does not change

(ii). As a result of osmosis, the volume of the solution

(a)   gradually increases   (b) gradually decreases

(c)   suddenly decreases   (d) suddenly increases

(iii).What is indicated when a chemical cell potential (E^o) has dropped to zero ?

(a). the concentration of the reactants has increased.

(b). the concentration of the reactants has increased.

(c).the cell reaction has completely stopped.

(d). the cell reaction has reached equilibrium.

Q-2. Give answers of any two questions given below. (04)

(i). "Entropy is a measure of the disorder of the system". Explain.

(ii).What would be the vapour pressure of a 0.5 molal solution of a non-volatile solute in benzene at 30° C? The vapour pressure of pure benzene at 30° C is 119.6 torr.(at. wt. C=12 , H = 1 gm/mol).

(iii). What is meant by standard electrode potential? Write the half reaction of a calomel reference electrode and amalgam electrode.

Q-3.Discuss in detail the Carnot cycle and hence show that the net work done is equal to the net heat absorbed for a cyclic process. (06)

OR

Q-3. (a)"Decrease in the function ' A' gives the maximum work that can be done by the system during the given change". Justify the statement. (03)

(b).One mole of nitrogen gas is mixed with three moles of oxygen gas at 25 ^{o}C to form a mixture at the final pressure of 1 atom, the initial pressure of each being also 1 atm. Calculate the molar entropy of mixing. (R = 8.314 Jmol⁻K) (03)

Q-4. Explain osmosis and osmotic pressure. Derive an equation correlating osmotic pressure with solution concentration. **(06)**

OR

Q-4. Describe the Beckmann method to measure freezing point depression and the static method for the measurement of vapour pressure lowering. **(06)**

Q-5. What are concentration cells? Derive an expression for the emf of an electrode cell and electrolyte concentration cell without liquid junction potential with suitable example. **(06)**

OR

Q-5. Describe the important applications of emf measurements. **(06)**