C 26047 (Pages o 3) Name.....

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2012

(CCSS)

Chemistry—Complementary

CH 4C 07—PHYSICAL CHEMISTRY—II

Time : Three Hours Maximum : 30 Weightage

I. Answer *all* the questions. Each question carries a weightage ¼. This part contains multiple choice, fill in the blank and one word answer questions.

1 An extensive property among the following is :

(a) Molality. (b) Heat capacity.

(c) Specific heat. (d) Density.

2 The cooling effect produced by a real gas during adiabatic expansion is called _____

3 The work done during a reversible process is _____

4 The conductance of a conductor of unit length and unit area of cross section is called.

(a) Specific resistance. (b) Specific conductance.

(c) Molar conductance.. (d) Unit conductance.

5 In a direct redox reaction chemical energy is converted to

6 The additional potential, over and above the standard electrode potential, which is needed to secure the evolution of a gas at the electrode, in an electrolytic cell is called _____

7 Due to surface tension liquids tend to minimise their _____

8 Properties which depend only on the number of particles and not their nature are called _____

9 A blood cell will shrink, when it is placed in :

(a) Water. (b) Isotonic solution.

(c) Hypertonic solution. (d) Hypotonic solution.

10 An aerosol among the following is :

(a) Smoke. (b) Fog.

(c) Dust storm. (d) All these.

11 What will you call the process of aggregation of colloidal particles to form a precipitate ?

12 In the equilibrium $CaCO_{3(s)}$ $CaO_{(s)} + CO_{2(g)}$, the number of components is _____

(12 x = 3 weightage)

Turn over

II. Answer *all* the questions. Each carries a weightage 1.

13 Mathematically formular the first law of thermodynamics.

14 The heat of formation of methane at constant pressure and 300 K is —75.83 kJ. Calculate the heat of formation at constant volume at 300 K.

15 Calculate the e.m.f. of the cell $Zn_I Zn^{2+}_{(0.01M)} \| Ag^{+}_{(c\ldots)} | Ag$ at 298 K. Given $E^{o} Zn^{2+}/Zn = -0.76$ V and $E^{o} Ag^{+}/Ag = 0.8$ V.

16 Write any *four* factors that influence the rate of evaporation of a liquid.

17 The time required for the flow of two liquids A and B through the same capillary is in the ratio 4 : 5 and their densities are in the ratio 2 : 1. Calculate the ratio of their viscosities.

18 Explain the term 'reverse osmosis'.

19 A 5 % solution of sucrose is isotonic with a 0.88 % solution of a molecular solute at the same temperature. Calculate the molar mass of the solute.

20 What is electrodialysis ?

21 Write any *three* mechanisms by which a colloid attains charge.

(9 x 1= 9 weightage)

III. Answer any *five* questions. Each carries a weightage 2.

22 Derive the Gibb's - Helmholtz equation.

23 What are redox electrodes ? Explain the construction and working of a redox electrode.

24 Explain the term molar polarisation. The refractive index and density respectively of water *at* 298 K is 1.333 and 0.9982 g cm^{-3}. Calculate the molar polarisation of water.

25 Derive an equation for the molecular mass of a dissolved solute from the laws of Osmotic pressure.

26 What are emulsions ? How are they classified ? Explain the cleansing action of soap.

27 Write note on :

(a) Sedimentation potential.

(b) Donnan membrane equilibrium.

28 Discuss the phase diagram of Lead-Silver system.

(5 x 2 = 10 weightage)

IV. Answer any *two* questions. Each question carries a weightage 4.

29 (a) State the Hess's law of constant heat summation and illustrate it with a suitable example.

(b) Write any *three* applications of Hess's law.

(c) Calcualte the enthalpy of formation of Benzene. Given, the standard enthalpy of combustion of Benzene as – 3266 kJ mot¬ and the standard enthalpies of formation of $CO_{2(g)}$ and H_2O(1) respectively as – 393.1 kJ and – 286 kJ.

30 (a) State and explain Kohlrausch's law. Write any *two* applications of the law.

(b) Discuss the construction and working of a Calomel electrode.

(c) What are the advantages of potentiometric tritrations ?

31 Explain the following :

(a) Triple point. (b) Eutectic temperature.

(c) Congruent melting point. (d) Phase diagram.

x 4 = 8 weightage)