BSC. PART - II EXAMINATION - 2014

CHEMISTRY HONOURS PHYSICAL

1. Choose the most appropriate answer from the following :

(a) Which is an extensive property ?
(i) Boiling point (ii) Density (iii) Heat (iv) Specific heat

(b) Spontaneous process is :
(i) Reversible (ii) Irreversible (iii) Isothermal (iv) Adiabatic

(c) Entropy of the universe is :
(i) Positive (ii) Negative (iii) Zero (iv) Constant

(d) Which is not an exact differential ?
(i) Internal energy (ii) Work (iii) Free energy (iv) Temperature

(e) pH of an eqeous solution of Na_2CO_3 is :
(i) Less than 7 (ii) Greater than 7 (iii) Zero (iv) 14

(f) K_{sp} of AgCl is 1.8×10^{-10} Precipitation will occur only when mixture of ions are:
(i) $10^{-4}[Ag^+]$ and $10^{-4}[Cl^-]$ (ii) $10^{-5}[Ag^+]$ and $10^{-5}[Cl^-]$
(iii) $10^{-6}[Ag^+]$ and $10^{-6}[Cl^-]$ (iv) $10^{-10}[Ag^+]$ and $10^{-10}[Cl^-]$

(g) The sum of transport number of anion and cation is :
(i) Less than one (ii) Equal to one (iii) Greater than one (iv) Zero

(h) The highest equivalent conductivity is of : (i) 1 M CH_3COOH
(ii) 0.1 M CH_3COOH (iii) 0.01 M CH_3COOH (iv) 0.001 M CH_3COOH

(i) Degree of dissociation $\alpha = \frac{\lambda_c}{\lambda_\infty}$ IS valid for :
(i)Strong electrolyte (ii) Weak electrolyte (iii)Non-electrolyte (iv) None of these

(j) The hydrolysis constant K_h for CH_3COONH_4 is :
(i) $K_h = \frac{K_w}{K_a}$ (ii) $K_h = \frac{K_w}{K_b}$ (iii) $K_h = \frac{K_w}{K_a.K_b}$ (iv) $K_h = \frac{K_a.K_b}{K_w}$

2. (a) For a closed system derive Gibbs-Helmholtz equation in terms of ΔG and ΔH.
(b) Discuss its applications.

3. (a) Explain the terms solubility and solubility product.
(b) Establish ralation between them.
(c) Solubility of AgCl is 1.3×10^{-5} mole/liter in water calculate the solubility of AgCl in $\frac{M}{10}$ KCl solution.

4. (a) What do you understand by adiabatic changes ? Derive adiabatic work related with (i) V – T (ii) P – T
(b) Calculate the maximun in (i) erg and in (ii) joule when 2 moles of an ideal gas expands isothermally at 27^0C from 1 liter to 10 liter.

5. (a) Explain the terms specific conductivity and equivalent conductivity.
(b) Explain the effect of dilution on specific and equivalent conductivities.

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(c) The resistance of $\frac{N}{10}$ solution of a salt is found to be 2.5×10^3 ohms. calculate the equivalent conductivity. (Cell constant = 1.15 cm^{-1})

6. What are liquid crystals ? Describe the comparative structural differences among solids, liquids and gas.

7. (a) Explain the terms hydrolysis and degree of hydrolysis.
   (b) Establish the relation between hydrolysis constant and degree of hydrolysis when salt of strong base and weak acid is hydrolysed.
   (c) Prove that pH + poH = 14.

8. (a) What is Nernst distribution law ? Discuss its applications :
   (i) When solute dissociates in one of the solvent.
   (ii) When solute associates in one of the solvent.
   (b) Explain the following terms : (i) Eutective point (ii) Triple point

9. Write notes on any two of the following : (i) Entropy of mixing
   (ii) Vant Hoff's reaction isotherm (iii) Free energy (iv) Conductometric titration