

BSC. PART - II EXAMINATION - 2016

CHEMISTRY HONOURS PHYSICAL

1. Choose the correct answer of the following questions :
- (a) The dissociation energy of methane is 360K. Cal/mol and that of ethane is 620K. Cal/mol. The C-C bond energy is :
(i) 210 (ii) 130 (iii) 180 (iv) 80
- (b) In a cyclic process :
(i) $q = W$ (ii) $q = T$ (iii) $q = E$ (iv) $q = S$
- (c) An example of Extensive property is :
(i) Temperature (ii) Internal energy (iii) Refractive index (iv) Viscosity
- (d) Ostwald's dilution law is applicable to :
(i) Nitric acid (ii) Acetic acid (iii) Sulfuric and (iv) HCl.
- (e) At 90°C pure water has hydrogen ion concentration 1×10^{-6} mole/l.. The value of K_w is :
(i) 1×10^{-14} (ii) 1×10^{-12} (iii) 1×10^{-6} (iv) None of these
- (f) In sulfur system number of components are :
(i) Zero (ii) One (iii) Two (iv) Three
- (g) Stalagmometer is used in the study of :
(i) Solid (ii) Liquid (iii) Gas (iv) None of these
- (h) Poise is the unit of :
(i) Viscosity (ii) Surface tension (iii) Parachor (iv) Vapour pressure
- (i) Total number of thermodynamic laws are :
(i) One (ii) Two (iii) Three (iv) Four
- (j) If ΔG of a reduction reaction is -21.20 kJ E^0 of the cell is :
(i) 0.239 V (ii) 0.220V (iii) -0.320V (iv) -0.110V
2. (a) Derive Gibbs Helmholtz equation.
(b) Free energy change in a process is -87.77 KJ at 25°C and -83.66 KJ at 35°C calculate ΔH at 35°C.
3. (a) Explain first law of thermodynamics.
(b) What is isothermal process derive an expression for the work done in an isothermal process ?
(c) Calculate the work done when 10 moles of an ideal gas expands from 10 liter to 100 liter at 300K.
4. (a) Using Carnot Cycle derive an expression for efficiency of a heat engine.
(b) Calculate the amount of heat supplied to a Carnot cycle working between 368 K and 288 K if the maximum work obtained is 800 J.
5. (a) Derive Clausius-Clapeyron Equation in its integrated form.
(b) For a solid dissociation pressure at 1,000 K and 800 K are 200 mm and 20mm respectively. Calculate its heat of dissociation in this temperature range.
6. (a) Discuss an adiabatic process.
(b) Derive a relation between P, V, T for an ideal gas undergoing an adiabatic change.

- (c) Prove that an adiabatic curve is steeper than isothermal curve of P-V change.
7. (a) Define Specific Conductance, Equivalent conductance, cell constant and Ionic mobility.
- (b) Discuss Arrhenius theory of electrolytic dissociation. What are its limitations?
- (c) Calculate the number of electrons in one Faraday (F) of electrical charge.
8. (a) What is salt hydrolysis?
- (b) Prove that $\text{pH} + \text{pOH} = 14$
- (c) When one liter of saturated Pb Cl_2 solution is evaporated to dryness the residue was found to be 4.5 gm. Calculate solubility product of Pb Cl_2 [Pb = 207, Cl = 35.5]
9. Write short notes on the following :
- (a) Henry's law (b) Nernst distribution law (c) Component and Degree of freedom
(d) Steam distillation (e) Ionic product of water