

Bago University
Department of Chemistry
Second Semester Examination, September 2019

Second Year BSc
(Geology Specialization)
Answer any six Questions

Chem 2004
Chemistry II
Time Allowed: (3) hours

1. (a) Fill in the blanks with the correct word(s), unit(s), and etc., as necessary.
- (i) The body centered unit cell contains _____ lattic point.
 - (ii) The coordination ratio of Rutile structure (TiO_2) is _____.
 - (iii) The study of a chemical reaction is fundamental concern to a chemist from _____ aspects.
 - (iv) A temperature increase favours an _____ reaction.
 - (v) The catalyst does not alter the value of equilibrium constant for any _____ reaction.
 - (vi) Both K_p and K_c do not vary with change of _____ for ideal gas.
- (b) Select the correct statement(s), word(s), unit(s) and etc., given in the followings.
- (i) Crystal are classified into (eight, six, seven) different crystal system.
 - (ii) The stoichiometry ratio of MgO is (2:2, 3:3, 1:1).
 - (iii) A complex reaction occurs in (two, more, two or more) steps.
 - (iv) The unit of 'k' for third order reaction is ($\text{mol}^{-2}\text{dm}^6\text{time}^{-1}$, $\text{mol}^{-2}\text{dm}^6$, time^{-1}).
 - (v) If ($Q < K$, $Q > K$, $Q = K$), the forward reaction predominates until equilibrium is established.
 - (vi) Chemical equilibrium is a (reverse, dynamic, activated) process.
2. (a) Illustrate the structure of NaCl and calculate the coordination ratio of this NaCl .
- (b) Draw the structure of the following;
- (i) Primitive cell
 - (ii) Body-centered unit cell
 - (iii) All face centered unit cell
 - (iv) Face centered A or B or C unit cell
3. (a) Describe the Wurtzite structure and show that the stoichiometry ratio of Zn:S is 1:1.
- (b) Determine the net number of Na^+ and Cl^- ions in the NaCl unit cell.
4. (a) Discuss the factors affecting of the reaction rate and explain the nature of reactants.
- (b) Explain about the order of a reaction summarily.

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5. (a) Derive the integrated rate equation for a second order reaction.
(b) Give three examples for second order reactions with relevant equations and names.
6. (a) Write short notes on some of the properties of two equilibrium constants (K_p and K_c).
(b) Derive the relationship between the equilibrium constant in terms of partial pressure (K_p) and the equilibrium constant in terms of concentration (K_c).
7. (a) The degree of dissociation of 2.40 moles of hydrogen iodide at 448 °C was found to be 22 percent. Calculate the number of moles of hydrogen iodide, hydrogen and iodine formed at equilibrium. Also calculate the equilibrium constant for the dissociation reaction.
- (b) For the reaction: $d + f \rightleftharpoons g + h$, give the expression for K_c and K_p . What are the units for K_c and for K_p ? If in the above reaction $P_d = 0.40$ atm, $P_f = 0.30$ atm, $P_g = 0.20$ atm and $P_h = 0.10$ atm, calculate K_p .
