Karanjia Auto College ,Karanjia,Mayurbhanj

CC-2, CHEMISTRY HONS.

1. Answer all the questions [1×8=8]

(a) At which condition a gas will show ideal behavior.

(b) Why KCl crystal is violet in colour.

(c) What is unit cell.

(d) For which type titration methyl orange used as an indicator.

(e) For ideal gases what is the value of compressibility factor.

(f) Write the condition for formation of precipitate.

(g) Define mean free path.

(h) Write the condition in which a gas to behaves as an ideal gas.

2. Answer any **Eight** the questions [1.5×8=12]

i. State law of equipartition of energy.

ii. What is the effect of temperature on viscosity of the liquid. iii.

Define Collision diameter.

iv. What will be the range pH of a titrimetric solution so that phenolphthalein can be used as an indicator.

v. Define the term buffer capacity.

vi. F-center created in crystal lattice due to which type of defect of crystal lattice. vii. How many symmetry elements present in a cubic close packed crystal. viii. State law of corresponding states.

ix. Write the relation between root mean square velocity, average velocity and most probable velocity of a gaseous molecule.

x. Give an example of polyelectrolyte system.

3. Answer any **Eight** the questions [2×8=16]

i. Write differences between Schottky and Frenkel defect.

ii. For a diprotic acid, Why $Ka_1 >> Ka_2$. III. What is liquid crystal.

Give an example.

iv. Explain the causes for deviation of gases from ideal behaviour. V.

Briefly analyze the powder XRD pattern of NaCl crystal.

vi. What is compressibility factor and write its application for deriving ideal nature of a gas.

vii. Explain mechanism of cleansing action of detergent. viii. Define degree of ionization

with an example. ix. State law of constancy of interfacial angles.

x. Calculate the Miller indices of crystal planes which cut through the crystal axes at (2a, -3b, -3c)

4. Answer any **Four** questions [4×6=24]

(a)What is compressibility factor and discuss its variation for different gases?

(b) What is law of corresponding states & derive the relation between critical constants and van der Waals constant

(c)

(i).Discuss the factors affecting degree of ionization of an electrolyte.

(ii) Calculate the pH of an aqueous solution obtained by mixing 25 ml of 0.2 M HCl with 50 ml of 0.25 M NaOH. Take $K_w = 10^{-14}$ mol^2 dm^{-6} at 25°C.

(d) i.Discuss powder diffraction method of X-ray analysis.

(ii) What is Braggs law and how it is useful for determination of structure of a crystal

(E) Derive Hendersons equation for acidic and basic buffer.

(f) i.Discuss the theory of acid-base indicator with example.

(ii) The solubility product of magnesium hydroxide $Mg(OH)_2$ at 25°C is 1.4×10^{-11}. Calculate the solubility of magnesium hydroxide in grams per litre?