Dr Gupal

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
SUMMER SEMESTER MID EXAMINATION- JUNE-2018
B.Tech (Civil) II Semester

COURSE CODE: 10B11CL212 MAX. MARKS: 50
COURSE NAME: Chemistry
COURSE CREDITS: 4 MAX. TIME: Two Hours

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Use of calculator is allowed*

Q1. Answer the following questions. [3x10 = 30]

a) What is optical activity? How is it measured? Explain by taking suitable examples.
b) What are diastereomer? Give examples. Describe the characteristics of diastereomer.
c) When compound X crystallizes it forms body centered cubic cells. The Unit cell edge length of compound X is 408.7 pm. Calculate its density. (MW of X is 107.9).
d) Explain an intramolecular and intermolecular hydrogen bonding. Explain on the basis of hydrogen bonding that *o*-nitropehnol can be separated from *p*-nitrophenol by steam distillation.
e) Explain the mechanism of nucelophilic substitution reaction in terms of stereo chemical output and reactions kinetics.
f) How R/S and E/Z configuration of organic compounds are determined?
g) Explain buffer action of mixture of acetic acid and sodium acetate
h) What is titration curve? Discuss titration curves for neutralization of a) strong acid and strong base b) weak acid and strong base
i) Derive Henderson's equation for calculating the pH of a given solution.
j) Derive Bragg's equation for diffraction of X-ray crystals. X rays of wavelength $2x10^{-10}$ m are diffracted from a crystal at an angle of 30^0. Assuming that $n = 1$, what is the distance (in pm) between layers in the crystal?

Q2. Explain electron gas model of metallic bond. What is the condition for metallic bond formation? Write limitations of electron gas model. [5]

Q3.Explain the free radical polymerization mechanism of vinyl compounds. Describe the method of preparation, properties and application of a) polystyrene b) Bakelite [7]

Q4.. Calculate the radius of SCC, BCC and FCC unit cell in terms of cell edge length a. Use this radius to calculate packing fraction of SCC, BCC and FCC unit cell. [8]