UNIVERSITY OF PUNE
[4361]-2
F. E. Examination-2013
Engineering Chemistry
(2008 Pattern)

Total No. of Questions : 6   [Total No. of Printed Pages :2]
[Time : 2 Hours]   [Max. Marks : 50]

Instructions

(1) Answer only three question from each section.
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Neat diagram must be drawn wherever necessary.
(4) Figures to the right indicate full marks.
(5) Use of logarithmic tables or electronic pocket calculator is allowed.
(6) Assume suitable data, if necessary.

Q1.

  a) State the law of constant elements of symmetry. Show that cubic lattice crystal exhibit 23 elements of symmetry. [07]

  b) Explain in brief about Schottky and Frenkel defects of ionic solids. [06]

  c) At what glancing angle would the first order diffraction from (110) plane of KCl observed using x-rays of wavelength of 180 pm. The dimension of the unit cell is 320 pm. [04]

<center>OR</center>

Q2.

  a) Define Atomic Packing Factor (APF). Prove that APF for BCC is 0.86 and that for FCC is 0.74 [07]

  b) Explain structural features, properties and applications of Fullerene [06]

  c) Define radius ratio and show that radius ratio for ionic crystal with CN-03 is 0.155. [04]

<center>1</center>

Q3.
 a) Explain with examples strong acid and weak base titration with titration [07] curve diagram and formulae to calculate pH at different stages.
 b) Calculate equivalent weight of $KMnO_4$ in acidic, basic and neutral [06] medium.
 c) Define [04]
    1) Normality   2) Equivalence point
    3) Primary standard   4) Molality

OR

Q4.
 a) Explain titration between CH_3COOH and NaOH with titration curve [07] diagram and formulae to calculate pH at different stages.
 b) Define precipitation titration. Explain Mohr's methods to determine [06] chloride content.
 c) 100 ml of 0.1 N NH_4OH (Ka=1.2×10^{-8}) is used to titrate with 0.2 [04] N HCl, calculate pH of titration mixture at 30 ml and 50 ml HCl added stage.

Q5.
 a) Define chain polymerization reaction and explain its free radical [06] mechanism.
 b) Give synthesis, properties and application of PVC and ABS. [06]
 c) Write a note on Glass transaction temperature. [04]

OR

Q6.
 a) Define vulcanization. Explain vulcanization of rubber with its change [06] in properties and structural changes.
 b) Distinguish LDPE and HDPE in reference of its synthesis, properties [06] and applications
 c) Write a note on biodegradable polymers. [04]