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[4856]-12

F.E. (First Semester) EXAMINATION, 2015

APPLIED SCIENCE—I (Chemistry)

(2008 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4 and
Q. No. 5 or Q. No. 6.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Use of logarithmic tables, slide rule, Mollier charts, electronic
pocket calculator is allowed.

(v) Assume suitable data, if necessary.

1. (a) Define Atomic Packing Factor (APF). Calculate PAF for SC
and BCC unit cells for cubic crystals. [7]
- (b) Explain structure, properties and application of fullerene. [6]
- (c) X-ray of wavelength 1.6\AA are diffracted by a Bragg's crystal
spectrometer of angle 14.2° in the first order. What is the
spacing of atomic layer in the crystal ? [4]

P.T.O.

Or

2. (a) State law of symmetry ? Explain various elements of symmetries for a cubic crystal with figures. [7]
- (b) What are effects of crystal defects on the properties of crystal ? Distinguish between Schottky and Frenkel defects in ionic crystals. [6]
- (c) Explain structure and properties of graphite. [4]
3. (a) Give theory, titration curve and formula to calculate pH at different stages in weak acid, strong base titration. [7]
- (b) What is complexometric titration ? Explain the direct titration with EDTA. [6]
- (c) 100 ml of std. solution of $K_2Cr_2O_7$, is prepared by dissolving 0.58 gm of the solid. 10 ml of this solution in the redox titration requires 16.2 ml sodium thiosulphates from burette. Calculate the normality of sodium thiosulphate solution (Eq. wt : $K_2Cr_2O_7 = 49$). [4]

Or

4. (a) What is meant by precipitation titration ? Explain Mohr's method for determination of is ions with chemical equations, procedure and calculations. [7]

- (b) Explain Ostwald's theory of acid-base indicator. [6]
- (c) 20 ml of 0.125 N HNO_3 is titrated against N/10 NaOH solution from burette. Calculate pH of titration mixture of : [4]
- (i) Initial stage
- (ii) 20 ml NaOH addition stage.
5. (a) Explain free radical chain mechanism with the help of suitable example. [6]
- (b) Differentiate between : [6]
- (i) Low density polyethylene and high density polyethylene.
- (ii) Thermoplastic and thermosoftening polymer.
- (c) What is liquid, crystal polymer ? Give their properties and uses. [4]

Or

6. (a) What is vulcanisation of rubber ? Give structural changes taking place on vulcanisation. State the effects on properties of rubber on vulcanisation. [6]

- (b) Give preparation, properties and application of any *two* : [6]
- (i) Polyvinyl chloride
 - (ii) Polypropylene
 - (iii) Styrene Butadiene Rubber (SBR).
- (c) What is glass transition temperature ? Give any *three* factors affecting on it. [4]