Total No. of Questions—**6**] [Total No. of Printed Pages—**4**

Seat No.	

[4956]-2

F.E. (First Sem.) EXAMINATION, 2016

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**, 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 and steam tables is allowed.

(*v*) Assume suitable data, if necessary.

1. (*a*) Define Atomic Packing Factor (APF). Calculate APF for SC, BCC and FCC unit cells of cubic crystal. [7]

(*b*) (*i*) Draw the following planes in a cubic system : [2]

(*a*) 100

(*b*) 111.

(*ii*) Show that radius ratio for ionic crystals with co-ordination No. 3 is 0.155. [4]

P.T.O.

(*c*) At what glancing angle would the first order diffraction from (110) plane of NaCl be observed using X-ray of wavelength 150 pm. The dimension of unit cell is 300 pm. [4]

Or

2. (*a*) What are the types of symmetries for crystals ? Explain them for a cubic crystal. [7]

(*b*) Explain structural features, properties and applications of fullerence. [6]

(*c*) Define : [4]

(*i*) Unit cell

(*ii*) Co-ordination Number

(*iii*) Anisotropy

(*iv*) Crystallography.

3. (*a*) Explain the strong acid-strong base titration curve with suitable indicator. Also give the formulae for calculation of pH before and after equivalence point. [7]

(*b*) (*i*) Calculate equivalent weight of $KMnO_4$ oxidising reagent in acidic medium.

(Atomic weights : K = 39, Mn = 55, O = 16) [3]

(*ii*) Define : [3]

(*a*) Equivalence Point

(*b*) Normality

(*c*) Molarity.

(*c*) 50 ml of NaCl solution requires 38.6 ml of M/50 $AgNO_3$ in Mohr's method. Calculate amount of chloride ion per litre of NaCl solution. [4]

Or

4. (*a*) What is complexometric titration ? Explain direct titration with EDTA. [7]

(*b*) What is Precipitation titration ? Explain Mohr's method for determination of Cl^- ions. [6]

(*c*) What are the characteristics of primary standard substances ? [4]

5. (*a*) What is glass transition temperature ? Explain the factors affecting Tg. [6]

(*b*) Give preparation reaction, properties and uses of any *two* of the following : [6]

(*i*) Polypropylene

(*ii*) HDPE

(*iii*) SBR.

(*c*) Explain free-radical chain reaction mechanism with suitable example. [4]

Or

6. (*a*) What is Vulcanisation of rubber ? Give the structural changes and effect on properties of natural rubber on vulcanisation by sulphur. [6]

(*b*) Explain compounding of Plastics. [6]

(*c*) Distinguish between thermosoftening and thermosetting resins. [4]