

Total No. of Questions : 12]

[Total No. of Printed Pages : 4

[3761]-102

F. E. (Semester - I) Examination - 2010

APPLIED SCIENCE - I

(June 2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions :

- (1) Answer **any three** questions from each section.
- (2) Answers to the **two sections** should be written in **separate books**.
- (3) Black figures to the right indicate full marks.
- (4) Neat diagrams must be drawn wherever necessary.
- (5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- (6) Assume suitable data, if necessary.

Constants :  $h = 6.63 \times 10^{-34}$  J.sec.

$m = 9.1 \times 10^{-31}$  kg

$e = 1.6 \times 10^{-19}$  C

$c = 3 \times 10^8$  m/sec.



### SECTION - I

- Q.1) (A) What are the types of Symmetries in crystal ? Discuss them with respect to cubic crystal. [07]
- (B) Explain the line defects in metallic crystals. State the effects of line defects on the properties of metals. [06]
- (C) X-ray of Wavelength  $1.6 \text{ \AA}$  are diffracted by a Bragg's crystal spectrometer at angle  $14.2^\circ$  in the first order. What is the spacing of atomic layer in the crystal ? [04]

OR

- Q.2) (A) What is meant by atomic packing factor ? Calculate atomic packing factor for SC, BCC and FCC Structure. [07]
- (B) Explain the Mesomorphic Phase. Give the types and applications of mesomorphic phase of solids. [06]

- (C) Define :
- (1) Unit Cell
  - (2) Co-ordination Number
  - (3) Anisotropy
  - (4) Crystallography [04]
- Q.3) (A) Explain the Titration Curve and calculation of pH for 0.1N HCl and 0.1N NaOH. When indicator can be used for this titration ? [07]
- (B) What is the oxidizing and reducing agent ? Give the types of redox titration and explain any one type of titration. [06]
- (C) 10 ml  $H_3PO_4$  solution on titration against 0.1N NaOH from burette requires 7.6 ml of NaOH for neutralization using Methyl Orange Indicator. Find the normality and strength of  $H_3PO_4$  solution. [04]

OR

- Q.4) (A) (1) 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. [04]
- (2) 25 ml of a solution containing  $Ca^{++}$  is titrated against 0.03M disodium EDTA from burette to get the end point 14.8ml in the complexometric titration. Calculate the amount of  $Ca^{++}$  ions per litre of the solution. [03]
- (B) What is the Mohr's Method for precipitation titration ? Give its procedure and formula for calculation. [06]
- (C) Define the terms :
- (1) Equivalence Point
  - (2) Titration
  - (3) Normality
  - (4) Molarity [04]
- Q.5) (A) Give the Polymerization Reaction, Properties and Applications **any two** of the following : [06]
- (1) Polystyrene
  - (2) Phenol - Formaldehyde Resin
  - (3) Silicon Rubber

