

Total No. of Questions : 12]

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[3561]-102

F. E. (Semester - I) Examination - 2009

APPLIED SCIENCE - I

(June 2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions :

- (1) Answer any **three** questions from each section.
- (2) Answer to the **two sections** should be written in **separate answer-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 is meant by Atomic Packing Factor ? Calculate APF for SC, BCC and FCC Structure. [07]
- (B) What are Crystal Imperfections and how they affect properties of Crystals ? Explain point defect. [06]
- (C) How ZnS acts as luminiscent ? Explain. [04]

OR

- Q.2) (A) What is Crystallography ? Explain various elements of symmetries in a perfect Cube. [07]
- (B) Explain the Mesomorphic Phase. Give types and applications of Mesomorphic Phase of Solids. [06]
- (C) Derive Bragg's Law of Diffraction. [04]

- Q.3)** (A) How are the pH of titration mixture calculated at various stages during strong acid - weak base titration ? [06]
- (B) Calculate equivalent weights of KMnO_4 in acidic, basic and neutral medium. [06]
- (C) The given chloride ion solution is diluted with distilled water to 250 ml volume. 50 ml of this diluted solution is titrated by Fajan's Method against $\text{M}/50 \text{ AgNO}_3$ to get end point at 15.2 ml. Calculate amount of Cl^- ions in the given chloride ion solution. [04]

OR

- Q.4)** (A) What is Complexometric Titration ? Explain Direct Titration with EDTA. [06]
- (B) Explain Ostwald's Theory of Acid-base Indicators. [06]
- (C) Calculate Molarity and Normality of a solution containing 0.5 gm NaOH dissolved in 500 ml solution. [04]

- Q.5)** (A) What is the Vulcanisation of Rubber ? Give the structural changes taking place on vulcanisation. State the effects on properties of rubber on vulcanisation. [07]
- (B) Distinguish between : [06]
- (1) Thermosetting and Thermosoftening Resins
 - (2) LDPE and HDPE
- (C) Give the free radical mechanism of polymerisation with suitable example. [04]

OR

- Q.6)** (A) Give the preparation reaction, properties and applications of : [07]
- (1) Phenol-Formaldehyde Resins
 - (2) ABS Plastic
- (B) What are Plastics ? Give the compounding of plastics with purposes of compounding of each constituent. [06]
- (C) What are Polymer Composites ? Give in brief properties and applications of Polymer Composites. [04]

