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Total No. of Questions : 11] [Total No. of Printed Pages : 6

**PK-415**

**M.Sc. IV Semester Chemistry (Reg./ATKT)**

**Examination June 2018**

**SOLID STATE CHEMISTRY**

**Paper - II**

*Time Allowed : Three Hours]*

*[Maximum Marks : 85*

**Note :** Attempt all questions from each sections.

**Section - A**

**Objective Type Questions**

10×1½=15

Q.1. Choose the correct answer:

- i) All spontaneous processes are accompanied by :
- (a) Increase in free energy
  - (b) Decrease in free energy
  - (c) No change in free energy
  - (d) None of the above

**(2)**

- ii) Which of the following are type of polymorphic transition :
- (a) Enantiotropic
  - (b) Monotropic
  - (c) Intrinsic and Extrinsic
  - (d) Both (a) and (b)
- iii) Which of the following is thermodynamically stable defect :
- (a) Point defect      (b) Line defect
  - (c) Surface defect      (d) Volume defect
- iv) To get a n-type semiconductor from silicon, it should be doped with a substance having valence:
- (a) 2                              (b) 1
  - (c) 5                              (d) 3
- v) The superconductivity is due to :
- (a) The crystal structure having no atomic vibration at 0°K.
  - (b) All electrons interact in superconducting state
  - (c) Electrons jump into nucleus at 0°K.
  - (d) None of the above

(3)

vi) Conducting polymers can be obtained from the following reaction :

- (a) Chlorination (b) Polymerisation  
(c) Doping (d) Bromination

vii) A magnetic field exists around :

- (a) Iron (b) Copper  
(c) Aluminium (d) Moving charges

viii) Which of the following are diamagnetic:

- (a) Silver  
(b) Copper  
(c) Silver and Copper  
(d) Iron

ix) Which of the following property of liquid crystal resembles that of solids -

- (a) Fluidity  
(b) Formation of droplets  
(c) Anisotropy  
(d) Isotropy

x) Which type of liquid crystal show change in colouration with temperature :

- (a) Smectic - B (b) Smectic - C  
(c) Nematic (d) Cholestric

(4)

### Section - B

#### Short Answer Type Questions

5 × 5 = 25

Q.2. Discuss Lyotropic and Thermotropic liquid crystals.

OR

Write a note on Liquid Crystal Display.

Q.3. Describe Band theory.

OR

Write a note on p-n junction.

Q.4. What are superconductors?

OR

Differentiate between extrinsic and intrinsic semiconductors.

Q.5. What is nucleation? Explain its types.

OR

Explain process of zone-refining for metal purification.

(5)

- Q.6. Derive an expression for number of Frenkel defects in a crystal.

OR

What are F-centers?

### Section - C

#### Long Answer Type Questions

5×9=45

- Q.7. What are the characteristics of solid state reaction? Explain Wagner's theory.

OR

What is sintering? Explain mass transport through diffusion. <http://www.onlinebu.com>

- Q.8. What do you understand by diffusion in solids? Explain Fick's Law of diffusion.

OR

What are line and plane defects? Explain with examples.

- Q.9. Discuss conductive polymers giving suitable examples.

OR

Write a note on organic superconductors.

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P.T.O.

(6)

- Q.10. How can materials be classified into conductors, semiconductors and insulators? Explain the basis on which this classification is made.

OR

What do you understand by super exchange interaction? Explain giving example.

- Q.11. Enumerate different types of liquid crystals. Explain with diagram their structure and properties.

OR

Describe how liquid crystals are being used in medical, electronic and other fields.



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