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H-6343

M.Sc. (Semester-IV) Examination, 2022

CHEMISTRY

(Solid State Chemistry)

Time Allowed : Three Hours

Maximum Marks : 70

Minimum Passing Marks : 25

Note : This question paper is divided into four sections. All sections are **compulsory**. Attempt questions as per given instructions in each sections.

SECTION-A

(Objective Type Questions)

Note : Attempt all the questions. Each question carries **1** mark. [1x10=10]

1. (A) Fill in the blanks type questions :

(i) Silicon doped with electron rich impurity forms_____.

(ii) One Bohr Magneton is equal to_____erg/gauss.

(iii) The temperature above which a ferromagnetic substance shows no ferromagnetism is called_____.

(iv) Density of solid decreases due to the_____defect.

(v) Ti_2O_3 shows conducting property below_____K temperature and insulating property at about_____K temperature.

(B) Multiple choice type questions :

(vi) The colour of LiCl when Li is in excess will be :

(a) Pink

(b) Yellow

(c) Blue

(d) Colourless

(vii) Metal excess defect is present in :

(a) FeO

(b) FeS

(c) NiO

(d) ZnO

(viii) Which rays are used in the powder method of crystal ?

(a) β-rays

(b) Gamma rays

(c) Monochromatic X-rays

(d) α-rays

(ix) Which kind of defects are introduced by doping ?

(a) Dislocation

(b) Schottky defect

(c) Frenkel defect

(d) Electronic defect

(x) Which is not antiferromagnetic ?

(a) MnO

(b) MnO_2

(c) Mn_2O_3

(d) Mn

SECTION-B

(Very Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **02** marks. (Word limit : 25-30 words) [2x5=10]

2. (i) What are superconductors ?

(ii) Differentiate Interstitial conduction and Vacancy conduction.

(iii) What are Fuel Cells ?

(iv) Differentiate Ferromagnetism and Anti-Ferromagnetism.

(v) Define Curie law and Curie-Weiss law.

(vi) What is F-centre ?

(vii) What is Luminescence ?

SECTION-C

(Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **04** marks. (Word limit : 250 words) [5x4=20]

3. Discuss the following :

   (i) Mechanism of latent image formation.

   (ii) Photoconductivity of Polymers

   (iii) Organic semiconductors

   (iv) Thermoelectric effects

   (v) Laser-ruby and Neodymium

   (vi) Organic Charge Transfer Complexes

   (vii) Preparation of thin films

SECTION-D

(Essay Type Questions)

Note : Attempt **any three** questions. Each question carries **10** marks. (Word limit : more than 500 words)

[3x10=30]

4. (i) Discuss the principle and applications of electron diffraction.

(ii) What are solid electrolytes ? Discuss their various applications.

(iii) What is crystal diffraction of X-rays ? Describe principle and uses of powder method and X-ray diffraction method.

(iv) (a) Describe electrochemical power generator.

(b) Discuss parabolic rate law.

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