Salahaddin University-Erbil Subject: Solid state physics

Collage of Basic Education Stage : four

Department : General Science date : 29/11/2016

Q1 A- In tetragonal crystal structure intercepts point (2, 1, 3), volume of unit cell 24 angstrom cubic and the c lattice parameter 6 angstrom determine the distance between inter planes distance.

B- Explain the second condition for electron stable in its orbit and then by using this condition calculate the electron radius in its orbital for hydrogen atom. 25 Marks

Q2 A- Complete the following statements

1- In hexagonal lattice points are at the ----------and lattice point per cell can be determine ---------- .

2- Atomic radius in the body centered cubic can be determine by this law ----------

B- Explain Bravais and Non Bravais lattice.

C- Compare between cubic and orthorhombic crystal structures in all fields.

25 Marks

Best Wishes

Lecture /instructor Dr Abbas H Rostam

Signature

Salahaddin University-Erbil Subject: Solid state physics

Collage of Basic Education Stage : four for evening

Department: General Science date: 30/1/2017

Notes draw the graph where necessary

Q1 A- Describe the body centered cubic in all fields.

B- Explain primitive cell and Non primitive cell. 24 Marks

C- What is face centered cubic and then calculate atomic packing factor for this cell.

Q2 A- Complete the following statements

1- Orthorhombic describe by this parameters ---------- .
2- The distance between planes and the volume of hexagonal crystal structure determine by these equations respectively ---------.----------.
3- There are --------- crystal system and --------- Bravais Lattices.
4- The position of End-centered or base-centered at ----------.
5- Crystal structure represented ----------. 16 Marks
6- Miller Indices represented----------.

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Best Wishes

Lecture /instructor Dr Abbas H Rostam

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Salahaddin University-Erbil Subject: Solid state physics

Collage of Basic Education Stage : four

Department: General Science date: 18/4/2017

Q1 1 - Explain Formation of allowed and forbidden bands in solid. 6 Marks

2- What is spin and what benefit of spin classification in solid? 3 Marks

3- Compare between conductor and semiconductor. 6 Marks

4- What is mean probability distribution of electrons is zero and where this occurs in solid explains this statement. 5 Marks

Q2 - Calculate the energy range (in eV) between $f_{(E)} = 0.75$ and $f_{(E)} = 0.25$ is $E_F = 4\ eV$ and for *(a)* T = 400 K and (b) T = 200 K. 10 Marks

Q3 Complete the following statements

Notes: all points held 2 marks except point fourt held 4 marks

1- The probability for occupying a given energy state ---------- with energy.
2- Energy gap is representing ---------- .
3- at low temperatures, bosons can behave very differently than fermions because ---------- .
4- Phonon is a particle which is ----------. 10 marks

Best Wishes

Lecture /instructor Dr Abbas H Rostam

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Salahaddin University-Erbil Subject: Solid state physics

Collage of Basic Education Stage : four for evening

Department: General Science date : 17/4/2017

Q1 A- Explain second condition for stable of electron in its orbital from this condition calculate the Bohr radius. 8 Marks

B- The radius of electron orbit of one element $2.385\ angstrom$ with atomic number is 8 Calculate energy of electron and velocity 8 Marks

Q2- A- Explains the Energy Band and the bond model creation of hole. 6 Marks

B- Why insulator no conduction current? 4 Marks

Q3 A- Complete the following statements.

1- Energy gap represent ---------- .
2- Energy of electron in hydrogen atom at fourth orbits is ---------, and orbital radius is ---------- with velocity---------- respectively.
3- Conductivity and resistivity -------,-------- decrease with decreasing------- respectively.
4- Energy gap of conductor is ---------- eV.
5- Conduction in semiconductor by ----------.
6- ---------- is the highest range of electron energies in which electrons are normally present at absolute zero temperature. 14 Marks

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Exam: Solid state physics

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