E081 Material Science

Basic Theory/ T1 Solid+ Liquid+ Gases

Q1

Define solid.

Q2

Explain the boundary of solids.

Q3

Explain the characteristics of matals.

Q4

What is metallic bonding?

Q5

What are the contents of ceramic?

Q6

Define liquid.

Q7

How does liquid particle bound?

Q8

Describe the followings.

(a)Volume (b) Pressure & buoyancy

Q9

Sketch typical phase diagram.

Q10

What is gas?

Q11

What are the properties of gases?

Q12

Describe

(a)Specific volume (b) Density

Q13

Describe ideal and perfect gas model.

Q14

Describe real gas effect.

Q15

Write Avogadro's law.

Q16

Write Dalton's law.

Q17

What is Reynolds number?

Q18

Explain thermodynamic equilibrium.

Basic Theory/ T2 Dielectric strength

Q19

Briefly explain transmission line insulation.

Q20

Describe insulation breakdown.

Q21

Explain volt-time characteristics of breakdown.

Basic Theory/ T3 Conductors+ Semi conductors

Q22

Sketch the followings

(a)Electronic polarization (b) Ionic polarization (c) Oriental polarization

Q23

Express chemical structure of

(a) Polyvinyl chloride (b) Polystyrane

Q24

Explain organic compounds.

Q25

Sketch the followings

(a) Simple cubic lattice (b) Face centred cubic lattice (c) body centred cubic

Q26

Explain covalent bonding.

Q27

Explain automatic structure of metal.

Q28

What is crystal?

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Advanced Theory 2/ EE402+512+513 Part 7

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Q29

Describe electronic polarization.

Q30

Describe ionic polarization.

Q31

Describe oriental polarization.

Advanced Theory 2/ EE402+512+513 Part 7

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Q32

Describe transistor.

Q33

Describe Bohr's theory of hydrogen atom.

Q34

Write the equation for photon radiation.

Q35

How does chemical stability achieve?

Q36

Explain electron energy levels in crystal bond theory.

Q37

Explain the chemical and atomic structure of insulator and conductor.

Q38

Explain the atomic structure of semi conductor.

Q39

Sketch atomic structure and energy model of P and N type semi conductors.

Q40

Write energy density equation for semi conductor.

Q41

According to the kinetic theory of gases, the average kinetic energy of gas molecule at an absolute temperature T is equal to 3KT/2 where K is Boltzaman's constant . What is average energy?

Q42

Calculate the kinetic energy , the potential energy and total energy of an electron in the ground state of a hydrogen atom.

Q43

Calculate the energy and radii of first four Bohr orbits for an electron in a hydrogen atom.

Q44

An electron in a hydrogen atom makes a transistor from a quantum state of principal quantum number n = 2 to the ground state. What is the energy and what is the frequency for the emitted light quantum?

Q45

Suppose an atom A has an ionization energy of 5eV and atom B has an electron attaining of 4eV . Suppose atom A and B are 5 Amgstrong apart. What is the energy required to transfer an electron from A to B?

Q46

A Germasium crystal specimen 1 mm has a total of 2.5×10^{7} electronics in it's conduction bond. What electron current flows when there is a field of 6 V cm^{-1} parallel to one face of cube.

Q47

Determine the average energy of an electron in the conduction band of a metal at 0°K as a function of Fermi level.

Q48

A specimen of a semi conductor has a Hall effect coefficient of 3.6×10^{-4} m^{3} coulomb $^{-1}$ and a resistivity of 8.93×10^{-7} Ω-cm. In a Hall effect expereiment, magnetic flux density 0.1 wb/m^{2}. Find Hall angle.

Basic Theory/ T$ Chemical effect on materials

Q49.

Explain chemical reaction inside electric cell.

Q50

Explain corrosion.

Q51

Describe the followings.

(a)Galvanic corrosion (b) Corrosion removal (c) Resistance

Q52

Write the ways to protect corrosion.

Q53

What are the forms of corrosion?

Q54

Express stress corrosion cracking.

Q55

Write notes for followings.

(a)Carbon steel (b)Stainless steel (c)Aluminium (d) Copper alloy