

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : Introduction to Solid State Physics

Subject Code : 4SC05SPC1

Branch : B.Sc. (Physics)

Semester : 5 Date :4/12/2015 Time :2:30 To 5:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1	Attempt the following short answer type questions:	(14)
	a) Write two characteristics of crystal lattice.	2
	b) Define a polyatomic crystal.	1
	c) Define 'Conductivity'	1
	d) With help of an example compare 'stress and strain'.	2
	e) Write full form of SQUID	1
	f) Discuss, how do alloys differ from compounds?	2
	g) Write significance of penetration depth in two sentences.	2
	h) Write the limitations of Ohm's Law.	2
	i) Define 'Dilation'.	1

Attempt any four questions from Q-2 to Q-8

Q-2	Attempt all questions	(14)
	a. Explain Bragg's Law. Draw suitable figures and use appropriate formulae to describe the same.	6
	b. Define structure factor. Discuss it for	8
	i. BCC crystal	
	ii. Mono atomic diamond Lattice	
	iii. Polyatomic crystal	
Q-3	Attempt all questions	(14)
	a. Write short notes on:	10
	i. Thermionic emission	
	ii. Hall effect	
	b. Describe the effects of temperature on Fermi-Dirac distribution function	4
Q-4	Attempt all questions	(14)
	a. Enlist the various types of super conductors. Explain any two with help of suitable examples.	6
	b. Describe BCS theory. Discuss its need to understand the super-conduction, superconductivity and superconductors.	8



Q-5	Attempt all questions	(14)
a.	Write short notes on :	10
	i. Thermal conductivity of metals	
	ii. Lorentz modification to Drude model	
b.	Define 'Elastic Energy Density' and explain its applications.	4
Q-6	Attempt all questions	(14)
a.	Write brief notes on:	8
	i. Isotope Effect	
	ii. Mechanical Effect	
b.	Explain the London's theory	6
Q-7	Attempt all questions	(14)
a.	Explain	8
	i. Josephson effects	
	ii. Meissner Effect	
b.	Describe, how Elastic waves are formed and propagated in cubic crystals?	6
Q-8	Attempt all questions	(14)
a.	Compare the 'Rotating crystal Method' and 'Powder Method' for determination of crystal structure.	10
b.	Write short note on SQUID	4

