



Rollno.....

End Semester Examination, December 2024

B.Sc.(H) Physics – Vth Semester

Solid State Physics (BSPH303A)

Time: 2.5 hrs.

Max Marks: **50**

Note: *All Questions are compulsory. Marks are indicated against each question.*

PART-A

Q.1 *Attempt any five questions:*

- (a) What is meant by space lattice, basis and crystal structure? [CO-1][L1] 2
- (b) Find the interplaner distance of cubic crystal for planes (220) with lattice parameter as $1.2\text{\AA}$ [CO-1][L1] 2
- (c) Draw (120), (220), (032), (101) planes in a cubic unit cell [CO-1][L1] 2
- (d) Define coordination number. Write coordination number for BCC, SCC and FCC lattice. [CO-1][L1] 2
- (e) What is Bragg's law? [CO-1][L1] 2
- (f). Show that the packing factor for fcc lattice is $\pi\sqrt{2}/6$. [CO-1][L1] 2
- (g) Define Vander waal's bonding. List out the strongest and the weakest bonding [CO-1][L1] 2

2x5

PART-B

- Q.2 Explain classical Langevin's theory of diamagnetism and obtain an expression for diamagnetic susceptibility. [CO-2] [L-2] **10**

OR

Discuss the Weiss Domain theory of ferromagnetism. Draw a typical B-H curve and describe the different magnetization processes. [CO-2] [L-2]
10

- Q.3 Relate the different type of polarizations? Obtain the value of electron polarizability. Which type of polarization depends on temperature and why? [CO-3] [L-3] **10**

OR

How Polarisation depends upon the frequency of AC field and temperature? Derive the Clausius-Mosotti Equation. For which kind of dielectrics this is valid [CO-3] [L-3]
10

- Q.4 What do you interpret from dielectric constant? By defining dielectric polarization, obtain the relationship between Polarization and surface charge density of induced charges in dielectric. [CO-3] [L-3]
10

OR

Conclude how the London's equations yields the ideal diamagnetism. [CO- 4] [L-4]
10

Q.5 What do you mean by Meissner effect? Compare the type-I and type –II superconductors.

[CO-4] [L-4]

10

OR

List out the crystal defects? Explain edge and screw dislocation

[CO- 1] [L-2] **10**