

C-5/2110
CONDENSED METTER-PHYSICS-I
SEMESTER-V
(SYLLABUS DECEMBER-2019)

TIME ALLOWED 3 Hrs

M.M 30

NOTE: The candidates are required to attempt two questions each from Section A & B
Section C will be compulsory.

Sec A

Q1. (a) Distinguish between primitive and non-primitive unit cell with the help of two dimensional diagram. (3)

b) How is Wigner Seitz primitive cell drawn? (2)

Q2. Draw the crystal structure of Diamond and describe fully. Hence calculate its packing fraction. (5)

Q3. (a) Find expression for spacing of planes in crystal lattice. (3)

(b) The interplanar spacing between (100) planes in BCC crystal system is 0.24 nm Find out the atomic radius in the given crystal system. (2)

Q4. (a) In an orthorhombic crystal a crystal plane makes intercepts 2 mm, 4 mm and 2 mm along the three axes. Crystallographic axes and corresponding primitive vectors are 3Å , 6Å and 4Å . Find out the Miller Indices for the intercepting plane. (3)

(b) Draw (110) (200) (100) planes. (2)

Sec B

Q5. (a) Derive Bragg's law of crystal diffraction. (2)

(b) Discuss briefly the methods of crystal structure determination. (3)

Q6. Find the reciprocal lattice in case of

- a) Body centred cube
- b) Face centred cube

(5)

Q7. Explain atomic form factor with mathematical expression. (5)

Q8. What is Brillouin zone? Explain Brillouin zone for square lattice. (5)

Sec C

Q9. Attempt any five questions carrying 2 marks each.

- (i) Define reciprocal lattice.
- (ii) What is advantage of rotating crystal method in diffraction?
- (iii) What is a space lattice?
- (iv) Draw Diamond structure.
- (v) Draw NaCl structure.
- (vi) What is geometrical structure factor? Write its expression.
- (vii) What is coordination number for hcp structure?

2x5=10