

G-3/341/21

Roll No.....

**M.Sc. III Semester Examination, April-2021**

**PHYSICS**

**Paper III**

(Condensed Matter Physics-I)

Time : 3 Hours ]

[Maximum Marks : 80

**Note :** *All questions are compulsory. Question Paper comprises of 3 sections. **Section A** is objective type/Multiple Choice questions with no internal choice. **Section B** is short answer type with internal choice. **Section C** is long answer type with internal choice.*

**SECTION 'A'**

**(Objective Type Questions)**

Fill in the blanks :

**1 × 8 = 8**

1. The number of possible types of Bravice lattice in one dimension is.....
2. Reciprocal vector's magnitude is proportional to the ..... power of direct vector's magnitudes.
3. Schottky defect is formed when .....
4. The total elastic energy per unit length in a screw dislocation is given by .....
5. The effective mass of an electron at the boundaries of Brillouin zone is .....
6. The probability that an electron will have an energy less than or equal to Fermi energy at 0K is.....
7. Super conductors show strong .....magnetic properties.
8. Domain wall properties are shown by.....materials.

P.T.O.

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**SECTION 'B'**

**6 × 4 = 24**

**(Short Answer Type Questions)**

**Note :** Answer the following questions in 250 words.

1. Discuss types of Bravice lattices in 2 dimensions.

Or

Write down different types of cubic lattices with their properties.

2. What is Frankel defect ? Discuss.

Or

Discuss the crystal structures of NaCl and diamond crystals.

3. Explain how effective mass of electron varies within the potential well.

Or

Discuss what are Brillouin zones ?

4. Classify the materials on the basis of their magnetic properties.

Or

Write down short note on Heisenberg one dimensional chain.

**SECTION 'C'**

**12 × 4 = 48**

**(Long Answer Type Questions)**

**Note :** Answer the following questions in 500 words.

1. What is reciprocal lattice ? Discuss its properties.

Or

Discuss experimental set up of Bragg's X-ray diffractometer.

2. Explain types of points defects in crystals.

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Or

Discuss different types of dislocations and Burger vectors associated with them.

3. Discuss the Kronig Penny model of solids.

Or

State and prove Bloch theorems.

4. What is Curie-Weiss law ? Discuss.

Or

What do you mean by magnons ? Discuss its properties.

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