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Unit 5 - Week 3 : Symmetry In Crystals Part 1

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-02-20, 23:59 IST.**

1) In the Hermann- Mauguin convention, the rotation symmetry of highest order in a diamond cubic lattice corresponds to ***1 point***

- 4
- $\bar{4}$
- 6
- $\bar{6}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\bar{4}$

2) The number of 4-fold rotation axes in an FCC lattice is ***1 point***

- 3
- 4
- 6
- 12

No, the answer is incorrect.
Score: 0

Accepted Answers:
3

3) Among the Bravais lattices below, the one that DOES NOT possesses a centre of inversion is ***1 point***

- triclinic
- face centred cubic

4) For a BCC crystal, the number of mirror planes parallel to any one of the six faces of the cube is equal to ***1 point***

- 1
- 2
- 3
- 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
1

5) In a diamond cubic lattice, the axis passing along one of the body diagonal is ***1 point***

- a 3 symmetry axis
- a $\bar{3}$ symmetry axis
- a $\bar{6}$ symmetry axis
- not a symmetry axis

No, the answer is incorrect.
Score: 0

Accepted Answers:
a 3 symmetry axis

6) The point symmetry element that is present in bcc but not in fcc is ***1 point***

- an inversion centre
- a four fold rotation axis
- a three fold rotation axis
- None. All symmetry operations of bcc are in fcc

No, the answer is incorrect.
Score: 0

Accepted Answers:
None. All symmetry operations of bcc are in fcc

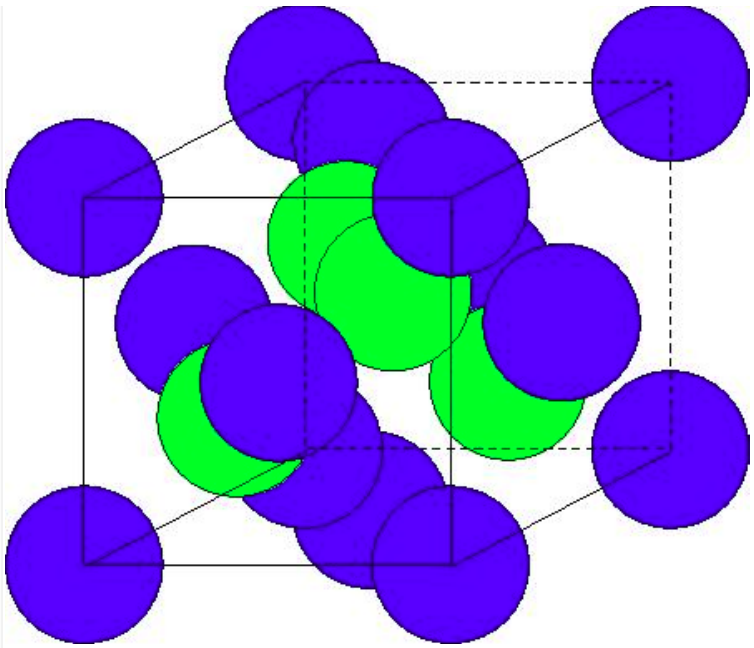
7) Consider a conventional diamond cubic cell with an atom at the corner of the cell. The location of the $\bar{4}$ rotoinversion axis in this cell is ***1 point***

- along the body diagonals
- parallel to one of the axes and passing through the centre of the two opposite faces.
- from the centre of the one of the 12 edges to the centre of the opposite edge.
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
parallel to one of the axes and passing through the centre of the two opposite faces.

8) A zinc blende crystal structure can be thought of as a diamond- cubic like structure where the atoms at the body diagonals are different from those at the face centres. In the figure below, you can consider that the blue and the green points represent different atoms. ***1 point***



The point symmetry element of a regular diamond cubic crystal(where the blue and the green points are the same atom), which is NOT present in the zinc blende structure are

- 3 axis along the body diagonal
- mirror plane parallel to one of the axes and passing through the square diagonal of the perpendicular face
- centre of inversion located 1/8 of the way along the body diagonal
- None. All the symmetries of the diamond are present in the zinc blende structure

No, the answer is incorrect.
Score: 0

Accepted Answers:
centre of inversion located 1/8 of the way along the body diagonal

9) Consider the following statements regarding rotoinversion axes: ***1 point***

S1: $\bar{1}$ is always equivalent to an inversion.
S2: $\bar{2}$ is always equivalent to a mirror reflection about a plane perpendicular to the axis of rotation.
Which of the following choices is correct?

- **S1** is correct but **S2** is wrong.
- **S2** is correct but **S1** is wrong.
- Both **S1** and **S2** are correct
- Both **S1** And **S2** are wrong.

No, the answer is incorrect.
Score: 0

Accepted Answers:
***S1** is correct but **S2** is wrong.*

10) The point symmetry element of an FCC lattice which is not present in a NaCl structure is ***1 point***

- centre of inversion
- 3 axis along body diagonal
- Mirror plane perpendicular to a face intersecting it along the diagonal
- none of the above 3

No, the answer is incorrect.
Score: 0

Accepted Answers:
none of the above 3

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