

Unit 3 - Introduction to Crystallography

Course outline

How to access the portal?

Introduction to Materials

Introduction to Crystallography

- Lecture 6: Crystal Systems and Bravais Lattices
- Lecture 7: Bravais Lattice and Symmetry in Crystals
- Lecture 8: Symmetry in Crystals
- Lesson 9: Symmetry & Correlation with the Bravais Lattice
- Lesson 10: Miller Indices (Planes & Directions)
- Quiz : Assignment-2**
- Assignment-2: Solution
- Feedback Form 2

Structures of Materials

Solid Solutions & Structures

Classification of Ionic Solids

Non-Crystalline Solids

Structure Determination

Imperfections in Solids

Week-0

Assignment-2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

1) Among 14 Bravais lattices, how many are primitive lattices? 1 point

- 10
 6
 7
 12

No, the answer is incorrect.
Score: 0

Accepted Answers:
7

2) Which of the following is/are not listed as a Bravais lattice? 1 point

- Body Centred Orthorhombic
 Body Centred Tetragonal
 Face Centred Tetragonal
 Face Centred Orthorhombic

No, the answer is incorrect.
Score: 0

Accepted Answers:
Face Centred Tetragonal

3) The relation between the volume of primitive cell (V_P) of face centered cubic (FCC) lattice and volume of non-primitive FCC lattice cell (V_{NP}) is $V_P = Q \cdot V_{NP}$, then Q is equal to 1 point

- 0.25
 0.33
 0.66
 0.50

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.25

4) What are the primitive lattice translation vectors (a_1, a_2, a_3) for FCC lattice? Consider x, y, z as unit vectors and a_x, a_y, a_z are lattice translational vectors of face centred cubic lattice. 1 point

- $a_1 = a(x)/2, a_2 = a(y)/2, a_3 = a(z)/2$
 $a_1 = a(x+y)/2, a_2 = a(y+z)/2, a_3 = a(z+x)/2$
 $a_1 = a(x+y-z)/2, a_2 = a(y+z-x)/2, a_3 = a(z+x-y)/2$
 $a_1 = a(x+y-z)/3, a_2 = a(y+z-x)/3, a_3 = a(z+x-y)/3$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $a_1 = a(x+y)/2, a_2 = a(y+z)/2, a_3 = a(z+x)/2$

5) Symmetry operations which is/are common to 1-D, 2-D and 3-D crystal lattices are: 1 point

- Inversion
 Rotational
 Reflection
 Translational

No, the answer is incorrect.
Score: 0

Accepted Answers:
Reflection

Translational

6) A cubic lattice must have: 1 point

- six 2-fold rotation axes
 four 3-fold rotation axes
 three 4-fold rotations axes
 four 4-fold rotations axes

No, the answer is incorrect.
Score: 0

Accepted Answers:
four 3-fold rotation axes

7) Face centered tetragonal (FCT) is not a Bravais lattice because it equivalent to 1 point

- a simple tetragonal with higher symmetry.
 a simple tetragonal with smaller size.
 a body centred tetragonal with higher symmetry.
 a body centred tetragonal with smaller size

No, the answer is incorrect.
Score: 0

Accepted Answers:
a body centred tetragonal with smaller size

8) Which crystal system has maximum number of Bravais lattices? 1 point

- Cubic
 Tetragonal
 Orthorhombic
 Monoclinic

No, the answer is incorrect.
Score: 0

Accepted Answers:
Orthorhombic

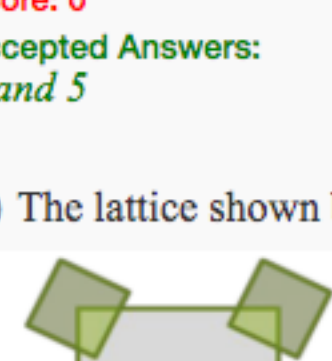
9) In case of two-dimensional (2-D) lattice, number of crystal systems and Bravais lattices respectively are: 1 point

- 4 and 5
 5 and 4
 4 and 4
 5 and 5

No, the answer is incorrect.
Score: 0

Accepted Answers:
4 and 5

10) The lattice shown below has which of the following symmetry elements? 1 point



- Diagonal mirror
 Horizontal mirror
 Vertical Mirror
 Four-fold rotation

No, the answer is incorrect.
Score: 0

Accepted Answers:
Four-fold rotation

11) When a point at position (x, y, z) undergoes an inversion symmetry operation, it becomes (x', y', z') are fractional coordinates in Cartesian system): 1 point

- $(-x, y, z)$
 $(x, -y, z)$
 $(x, y, -z)$
 $(-x, -y, -z)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $(-x, -y, -z)$

12) In terms of Miller Indices, the direction pointing out from a point at $(0, 0.5, 0.5)$ to another point at $(0, -0.5, 0)$ would be: 1 point

- 0-12
 0-21
 012
 021

No, the answer is incorrect.
Score: 0

Accepted Answers:
0-21

13) If fraction intercepts of a plane on x, y, z axes are 1, 1/2, 1/3 respectively, the Miller indices of the plane are 1 point

- 321
 123
 632
 1 0.5 0.33

No, the answer is incorrect.
Score: 0

Accepted Answers:
123

14) The equivalent planes in a tetragonal system are 1 point

- $(100), (001)$ and (010)
 (001) and (010)
 (100) and (001)
 (100) and (010)

No, the answer is incorrect.
Score: 0

Accepted Answers:
 (100) and (010)

15) The angle between (111) and (110) planes in a cubic crystal is 1 point

- 45°
 90°
 35.3°
 56.7°

No, the answer is incorrect.
Score: 0

Accepted Answers:
 35.3°