

Unit 11 - Week 10

Course outline

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Wigner Seitz Cell and Introduction to Brillouin Zones

Brillouin Zones, Diffraction, and Allowed Energy Levels

E Vs k, Brillouin Zones and the Origin of Bands

Quiz : Assignment 10

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Assignment 10

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

Due on 2019-10-09, 23:59 IST.

Note : More than one answer may be right. Partial marks awarded if only some of the correct answers are selected. No marks awarded if even one of the wrong answers is selected:

- 1) Wigner-Seitz cell is a region in the space that is _____ to a given lattice point than to any other lattice point with respect to a crystal structure. **1 point**
- Closest
 - Farthest
 - Nearest
 - Dependent

No, the answer is incorrect. Score: 0

Accepted Answers: Closest Nearest

- 2) In 2D, Wigner-Seitz cell about a lattice point generally has ___ sides except for square and ___ geometry. **1 point**

- 5, rectangle
- 6, circle
- 5, circle
- 6, rectangle

No, the answer is incorrect. Score: 0

Accepted Answers: 6, rectangle

- 3) Bragg Plane is the ___ bi-sector to the line joining the origin of reciprocal space to any reciprocal lattice point **1 point**

- Equidistant
- Perpendicular
- Angular
- Vertical

No, the answer is incorrect. Score: 0

Accepted Answers: Perpendicular

- 4) First Brillouin Zone can be defined/stated as _____. **1 point**

- It is the first W-S cell about a reciprocal lattice point in reciprocal space.
- Region before crossing any Bragg plane in any direction.
- Region in space that can be reached from origin without crossing a single Bragg plane.
- Region that is a subset of the region enclosed by the 2nd Bragg plane in all directions.

No, the answer is incorrect. Score: 0

Accepted Answers: It is the first W-S cell about a reciprocal lattice point in reciprocal space. Region before crossing any Bragg plane in any direction. Region in space that can be reached from origin without crossing a single Bragg plane. Region that is a subset of the region enclosed by the 2nd Bragg plane in all directions.

- 5) Process to draw or to identify the 1st Brillouin Zone is shown step wise step. What option(s) will be the step in the blank space? **1 point**

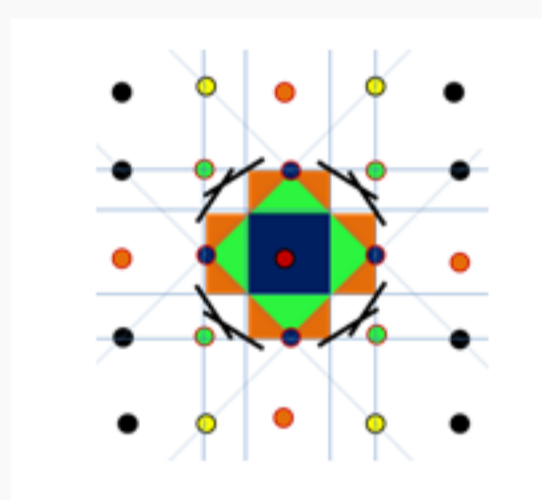
(Real lattice **representation** → Reciprocal lattice → ____ → 1st Brillouin Zone)

- Identifying Bragg planes
- Identifying inner most region in Wigner-Seitz cell
- Drawing Wigner –Seitz cell
- Identifying the bonding in the structure

No, the answer is incorrect. Score: 0

Accepted Answers: Identifying Bragg planes Identifying inner most region in Wigner-Seitz cell Drawing Wigner –Seitz cell

- 6) Third and second Brillouin zones are fragmented into _ and _ respectively. **1 point**



- Two, four
- Four, eight
- Eight, four
- Two, four

No, the answer is incorrect. Score: 0

Accepted Answers: Eight, four

- 7) First Brillouin Zone of body centred cubic is: **1 point**

- (i). Wigner-Seitz cell of face centred cubic.
- (ii). Rhombic dodecahedron.

- Only (i) is true.
- Only (ii) is true
- Both are true.
- First statement is true and second is false.

No, the answer is incorrect. Score: 0

Accepted Answers: Both are true.

- 8) Reduce Zone Scheme is based on____ Brillouin zone. **1 point**

- First
- Second
- Third
- Fourth

No, the answer is incorrect. Score: 0

Accepted Answers: First

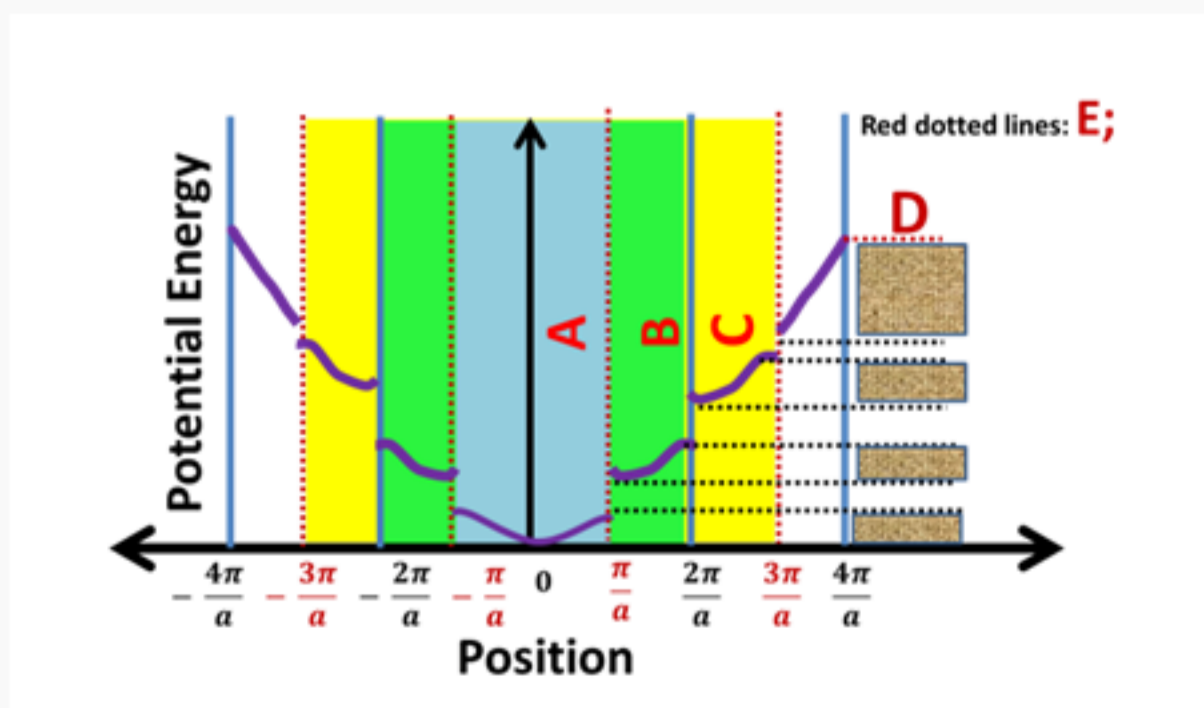
- 9) Wherever diffraction condition is satisfied or diffraction occurs, certain values of energies are _____. **1 point**

- Allowed
- Forbidden
- Discontinues
- Existing

No, the answer is incorrect. Score: 0

Accepted Answers: Forbidden

- 10) Identify A, B, C, D, and E in the below given figure. **1 point**



- A,B and C are Brillouin zones, band diagram, Bragg planes
- 1st BZ, 2nd BZ, 3rd BZ, Allowed energy bands, Real lattice planes
- 1st BZ, 2nd BZ, 3rd BZ, Forbidden bands, Bragg planes
- 1st BZ, 2nd BZ, 3rd BZ, Energy band diagram, perpendicular bi-sectors

No, the answer is incorrect. Score: 0

Accepted Answers: A,B and C are Brillouin zones, band diagram, Bragg planes 1st BZ, 2nd BZ, 3rd BZ, Energy band diagram, perpendicular bi-sectors