

Unit 2 - Introduction to Materials

Course outline

How to access the portal?

Introduction to Materials

- Lecture 1: Material Evolution
- Lecture 2: Bonding in Materials
- Lecture 3: Correlation between bond and physical properties
- Lecture 4: Crystal Structure: Lattice and Basis
- Lecture 5: Unit Cell (Primitive & Non-primitive)
- Quiz : ASSIGNMENT 1
- Assignment-1: Solution
- Feedback Form 1

Introduction to Crystallography

Structures of Materials

Solid Solutions & Structures

Classification of Ionic Solids

Non-Crystalline Solids

Structure Determination

Imperfections in Solids

Week-0

ASSIGNMENT 1

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) Crystal structure of materials is 1 point

- a combination of points and space
- a combination of point lattice and a motif.
- dependent on motif.
- is determined by arrangement of points in space.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a combination of point lattice and a motif.

2) Which of the following materials generally have highest specific strength? 1 point

- Metals.
- Ceramics.
- Polymers.
- Composites.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Composites.

3) Which group of elements have largest electron affinities? 1 point

- Halogens
- Inert gases
- Alkali earth metals
- Alkali Metals

No, the answer is incorrect.
Score: 0

Accepted Answers:
Halogens

4) Which of the following is true for net interatomic force (F) and potential energy (W) at the equilibrium distance of separation (r_0)? 1 point

- F is not zero W is maximum.
- F is zero and W is maximum.
- F is zero and W is minimum.
- F is not zero W is minimum.

No, the answer is incorrect.
Score: 0

Accepted Answers:
F is zero and W is minimum.

5) The bond energy magnitudes in ascending order can be expressed by 1 point

- Hydrogen bond → Vander Waals bond → Metallic bond → Ionic bond
- Vander Waals bond → Hydrogen bond → Metallic bond → Ionic bond
- Vander Waals bond → Hydrogen bond → Ionic bond → Metallic bond
- Hydrogen bond → Vander Waals bond → Ionic bond → Metallic bond

No, the answer is incorrect.
Score: 0

Accepted Answers:
Vander Waals bond → Hydrogen bond → Metallic bond → Ionic bond

6) Metallic bonding has following attributes: 1 point

- Electrons are delocalised
- Free electrons form clouds
- Bonds are non-directional in nature
- Bonds form due to asymmetry in electron clouds

No, the answer is incorrect.
Score: 0

Accepted Answers:
*Electrons are delocalised
Free electrons form clouds
Bonds are non-directional in nature*

7) High bond energy of a solid results in 1 point

- high melting point
- high elastic modulus
- low coefficient of thermal expansion
- high dipole moment

No, the answer is incorrect.
Score: 0

Accepted Answers:
*high melting point
high elastic modulus
low coefficient of thermal expansion*

8) Which of the following is necessary condition for a point lattice? 1 point

- Symmetrical arrangement of points in space
- Regular arrangement of points in space
- Regular arrangement of points in space with identical neighborhood
- Symmetrical arrangement of points in space with identical neighborhood

No, the answer is incorrect.
Score: 0

Accepted Answers:
Regular arrangement of points in space with identical neighborhood

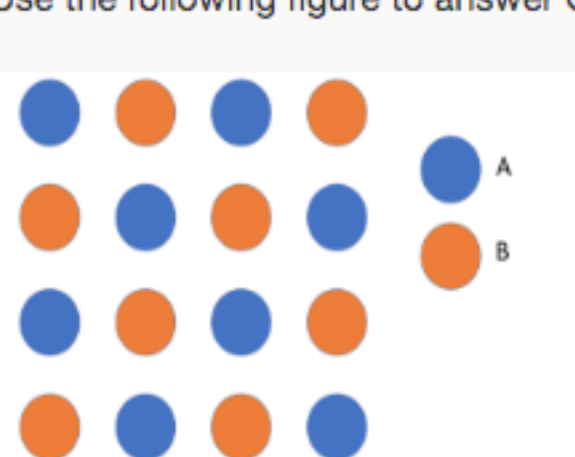
9) Unit cell in a periodic three-dimensional point lattice will have following attributes: 1 point

- It will be the smallest repeatable unit
- Choice of its shape is unique
- It must have one lattice point
- Its volume is independent of its shape.

No, the answer is incorrect.
Score: 0

Accepted Answers:
*It will be the smallest repeatable unit
It must have one lattice point
Its volume is independent of its shape.*

10) Use the following figure to answer Questions 1 point



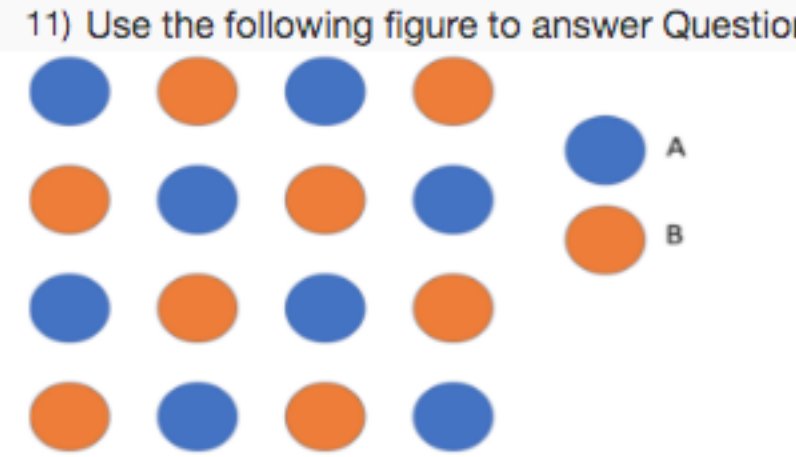
Choose the correct option for given pattern.

- Primitive lattice will contain one of A and one of B
- Non Primitive lattice will contain one of A and one of B
- Primitive lattice will contain two of A and two of B
- Non Primitive lattice will contain two of A and two of B

No, the answer is incorrect.
Score: 0

Accepted Answers:
*Primitive lattice will contain one of A and one of B
Non Primitive lattice will contain two of A and two of B*

11) Use the following figure to answer Questions 1 point



What does motif consist of?

- one of A and one of B
- two of A and two of B
- three of A and three of B
- four of A and four of B

No, the answer is incorrect.
Score: 0

Accepted Answers:
one of A and one of B

12) Bond energy of ionic bond increases as 1 point

- Difference in the electronegativity of cations and anions increases.
- Charges on ions increase.
- Separation between ions becomes larger than equilibrium separation.
- Ions become bigger.

No, the answer is incorrect.
Score: 0

Accepted Answers:
*Difference in the electronegativity of cations and anions increases.
Charges on ions increase.*

13) A primitive unit cell 1 point

- always have one formula unit.
- has at least one formula unit.
- has at least one formula unit but never more than two.
- always has more than two formula units.

No, the answer is incorrect.
Score: 0

Accepted Answers:
has at least one formula unit.

14) Polymer materials: 1 point

- Have high specific strength.
- Have high modulus of elasticity.
- High excellent corrosion resistance.
- High co-efficient of thermal expansion.

No, the answer is incorrect.
Score: 0

Accepted Answers:
*High excellent corrosion resistance.
High co-efficient of thermal expansion.*

15) Which of the following is a characteristic of crystalline structure? 1 point

- Lower density
- Lower bond energy as compared to amorphous counterpart
- A sharp melting point
- Fixed lattice constant

No, the answer is incorrect.
Score: 0

Accepted Answers:
*A sharp melting point
Fixed lattice constant*

16) Which one of the following is the correct bond angle between atoms for tetrahedral bond? 1 point

- 180°
- 120°
- 109.5°
- 120°

No, the answer is incorrect.
Score: 0

Accepted Answers:
109.5°