Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2019-03-06, 23:59 IST.**

1) A certain crystal is found to have a 4 fold axis and a 3 fold axis of rotation. Note that there might be other symmetry elements. The crystal system can be:

- cubic only
- tetragonal only
- either cubic or tetragonal but not trigonal
- either cubic, tetragonal or trigonal. It can be any of the three.

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
cubic only

2) A certain crystal has a 3-fold axis of rotation but no 4-fold axis of rotation or rotoinversion. There might be other symmetry elements. The possibilities for the system of this crystal is/are:

- trigonal only
- trigonal and hexagonal
- trigonal and cubic
- hexagonal and cubic

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
trigonal and hexagonal

3) The result of a c-glide plane parallel to the XY plane and intersecting the z-axis at 0.5 on an arbitrary point \((x,y,z)\) is to give the point \((y,x,z+0.5)\) **1 point**

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
\((y,x,z+0.5)\)
4) The result of a \( \text{3}_2 \) screw rotation about the x-axis on an arbitrary point \((x, y, z)\) is to give 1 point the point

\[
\begin{align*}
(x/2, y\sqrt{3}/2, z) \\
(x + 2/3, -y/2 - z\sqrt{3}/2, y\sqrt{3}/2 - z/2) \\
(x + 1/3, -y/2 - z\sqrt{3}/2, y\sqrt{3}/2 - z/2) \\
\text{None of the other choices}
\end{align*}
\]

No, the answer is incorrect.

Score: 0

Accepted Answers:
\[(x + 2/3, -y/2 - z\sqrt{3}/2, y\sqrt{3}/2 - z/2)\]

5)
A certain compound AB crystallizes in a structure with a cubic unit cell. A atoms occupy the corners of a simple cube and a B atom occupies the body center. We can infer that the order of the point group of this compound is

- 12
- 24
- 48
- None of the other choices

No, the answer is incorrect.
Score: 0
Accepted Answers:
48

6) The inverse operation of a $\bar{6}$ rotoinversion operation is

- a $\bar{6}$ rotoinversion
- a 6 rotation
- a $6^5$ rotation
- None of the other choices

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the other choices

7) The product of two $6_2$ screw rotations about the same axis is

- another $6_2$ screw rotation
- a $3_2$ screw rotation
- a $3_1$ screw rotation
- None of the other choices

No, the answer is incorrect.
Score: 0
Accepted Answers:
a $3_2$ screw rotation

8) A certain compound AB crystallizes in a structure with a cubic unit cell. A atoms occupy the corners of a simple cube and a B atom occupies the body center. Assuming that two opposite corners of the unit cell are located at $(0,0,0)$ and $(1,1,1)$, the location(s) of the inversion center(s) is/are

- body center only
- body center and face centers
- body center, face centers and edge centers
- body center, face centers, edge centers and corners

No, the answer is incorrect.
Score: 0
Accepted Answers:
body center, face centers, edge centers and corners

9) A certain crystal having a 6-fold axis of rotation and a mirror plane perpendicular to this

- 1 point
axis, has a space group of order 24. Based on this information, the complete set of possible orders of
the point group of this crystal is

- 24
- 12 and 24
- 6, 12 and 24
- 6, 12, 18 and 24

No, the answer is incorrect.
Score: 0
Accepted Answers:
12 and 24

A certain crystal has a point group of order 24. The complete set of crystal system(s) to which it can belong is/are

- cubic only
- hexagonal only
- trigonal and hexagonal
- cubic, trigonal and hexagonal

No, the answer is incorrect.
Score: 0
Accepted Answers:
cubic, trigonal and hexagonal