

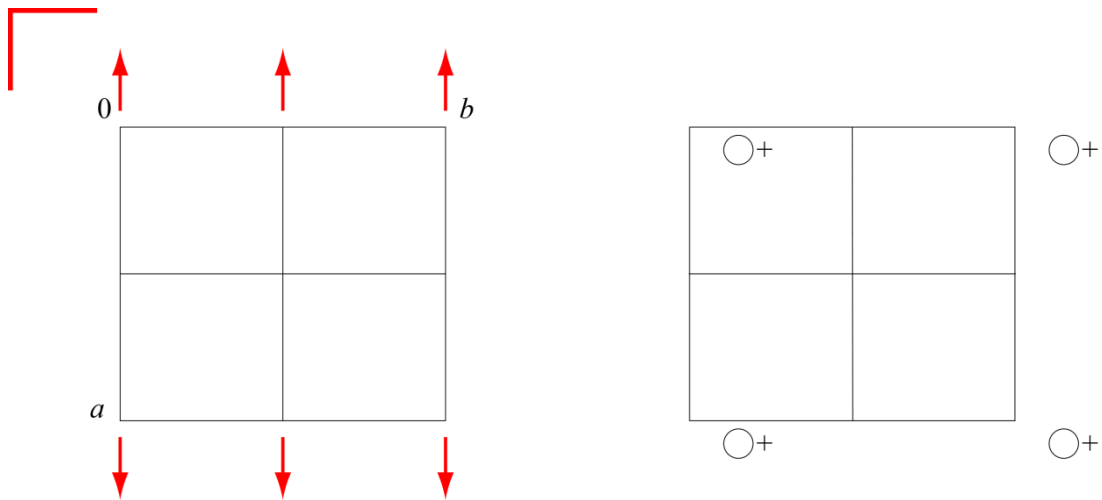
NANO 704 – Spring 2019
Quiz 2

1) Match the symmetry transformations below to the correct description by filling in the corresponding letter in the blank.

- | | | |
|----------|---|---------------------------|
| a) _____ | $\rho(\vec{r}) = \rho(\tilde{m}_b \cdot \vec{r})$ | A: 2_{1b} @ $\vec{0}$ |
| b) _____ | $\rho(\vec{r}) = \rho[\tilde{m}_b \cdot \vec{r} + (\vec{a} + \vec{c})/2]$ | B: 2_b @ $\vec{a}/4$ |
| c) _____ | $\rho(\vec{r}) = \rho(\tilde{2}_b \cdot \vec{r})$ | C: 2_{1b} @ $\vec{a}/4$ |
| d) _____ | $\rho(\vec{r}) = \rho[\tilde{2}_b \cdot (\vec{r} - \vec{a}/4) + \vec{a}/4]$ | D: n_b @ $\vec{0}$ |
| e) _____ | $\rho(\vec{r}) = \rho(\tilde{2}_b \cdot \vec{r} + \vec{b}/2)$ | E: 2_b @ $\vec{0}$ |
| f) _____ | $\rho(\vec{r}) = \rho[\tilde{m}_b \cdot (\vec{r} - \vec{b}/4) + \vec{b}/4]$ | F: m_b @ $\vec{0}$ |
| g) _____ | $\rho(\vec{r}) = \rho[\tilde{2}_b \cdot (\vec{r} - \vec{a}/4) + \vec{a}/4 + \vec{b}/2]$ | G: m_b @ $\vec{b}/4$ |

- 2) The space-group diagrams below are incomplete.
 i) Graphically indicate the missing symmetry elements;
 ii) Complete the corresponding general-position diagram.

Legibility is required for full credit.



Hints:

- 1) $\rho(\vec{r}) = \rho(\tilde{2}_a \cdot \vec{r})$
- 2) $\rho(\vec{r}) = \rho(\tilde{m}_c \cdot \vec{r})$
- 3) $\rho(\vec{r}) = ?$