Memory Metal Assessment

Matching

Match the word with the best definition.

____ 1. Austenite
____ 2. martensite
____ 3. transition temperature
____ 4. Nitinol
____ 5. alloy
____ 6. smart material
____ 7. unit cell
____ 8. phase

a. a pattern than can be shifted repeatedly to create the entire structure of atoms in crystal
b. a solid solution composed of two or more metals
c. alloy containing nearly equal amounts of nickel and titanium
d. a physical state of matter
e. a substance that can respond to stimuli in its environment
g. high temperature phase
h. low temperature phase
i. the temperature at which a phase transformation occurs

Multiple Choice

Choose the best answer.

_____ 9. Austenite exhibits which characteristic?
a. contains more nickel than martensite
b. is more rigid than martensite
c. is more flexible than martensite
d. both a and c

_____ 10. At room temperature Nitinol can exist in either of two structures, which are dependent upon
a. the mass of the sample.
b. the exact ratio of Ni to Ti.
c. the length of the sample.
d. the diameter of the rod.

_____ 11. In some phase changes like that of ice and water, there is a noticeable change; however, there is no visible phase change between austenite and martensite because
a. it only occurs at the atomic level.
b. only two atoms exchange places.
c. the structures are the same
d. the temperature is too high
e. no phase change occurs.

12. Describe why heating a memory metal sample to over 500 C causes it to take on a new "remembered" shape.

DRAFT WASSEG