Topics on Industrial Building Design and Design of Non-Building Structures
Quiz for Session 6: High and Low Temperature Applications– July 28, 2020
Due: August 25, 8:00 a.m. EDT – Submit through the online form

1. AISC 360 provides commentary discussion on fracture control for special service conditions (such as structures exposed to low temperatures) for which chapter?
    a. Chapter A
    b. Chapter B
    c. Chapter D
    d. None of the above

2. For what type of stress does brittle fracture occur?
    a. Compression
    b. Tension
    c. Shear
    d. All of the above

3. The Charpy V-notch impact test is conducted in accordance with which ASTM standard?
    a. A36
    b. A335
    c. A673
    d. A992

4. High temperatures can affect the coefficient of expansion and other material properties, including…
    a. Modulus of elasticity
    b. Yield strength
    c. Tensile strength
    d. a, b and c

5. At high temperatures, the stress-strain curve loses its well-defined yield point and the curve becomes nonlinear at earlier stages of loading. This can affect…
    a. The yield strength definition
    b. The strength of members controlled by stability limit states
    c. Both a and b
    d. The graphitization temperature

6. Generally, the yield strength reduction factor, k_y, in AISC Appendix 4 Table A-4.2.1 is not acceptable for designing at elevated service temperatures because…
    a. k_y is defined at 2% strain, which is applicable only where large inelastic deformations are acceptable
    b. The values in Table A-4.2.1 are conservative
    c. k_y is used only for stainless steels
    d. k_y is intended to reduce the risk of temper embrittlement

7. For a column of A242 Type 1 material subjected to a service temperature of 900 °F for a design life of 30 years, the creep behavior is primarily dependent on:
    a. The magnitude of sustained stress
    b. The magnitude of transient stress, including lateral loads from wind and seismic
    c. The natural frequency
    d. None of the above

8. The following metallurgical changes can cause brittleness in steels subjected to high temperatures. Which of these can be reduced by limiting the cold-working strains during fabrication?
    a. Graphitization
    b. Temper embrittlement
    c. Strain aging
    d. a, b and c

9. Commonly-available structural steel shapes and plates are usually the most economical materials for structures subjected to temperatures…
    a. Equal to or less than 1,000 °F
    b. Equal to or greater than 1,000 °F
    c. Equal to or less than 700 °F
    d. Equal to or greater than 700 °F

10. These bolts are appropriate for a connection subjected to sustained loading at a temperature of 900 °F:
    a. A307
    b. A193 Grade B7
    c. A325 Type 1
    d. A490