1. A new yield criteria is defined as $\sigma_1^2 - \sigma_3^2 = C$. In terms of $Y$ (uniaxial yield strength), $C$ is given by
   a. $Y$
   b. $2Y$
   c. $Y^2$
   d. $Y^3$
2. Which of the following is true regarding plastic strain and the path through which it has been given the deformation
   a. Plastic strain is path dependent
   b. Plastic strain is path independent
   c. It depends on the deformation configuration, whether plastic strain is path dependent
   d. Nothing can be said about plastic strain with regard to the path of deformation
3. The term $\frac{1}{2} [(\sigma_1 - \sigma_2) + (\sigma_2 - \sigma_3) + (\sigma_3 - \sigma_1)]$, represents
   a. Effective stress under Tresca criterion
   b. Effective stress under Von-Mises criterion
   c. Tensile strength of a material
   d. Yield strength of a material
4. The two relations $d\bar{\varepsilon} = \sqrt{\frac{2}{3}} (d\varepsilon_1^2 + d\varepsilon_2^2 + d\varepsilon_3^2)$ and $\bar{\varepsilon} = \sqrt{\frac{2}{3}} (\varepsilon_1^2 + \varepsilon_2^2 + \varepsilon_3^2)$ are equivalent in Von-Mises criterion under following cirumstances
   a. Only when strains are very small
   b. Under all conditions
   c. Only when strains are very large
   d. Only when $d\varepsilon_1 : d\varepsilon_2 : d\varepsilon_3$ is maintained constant throughout the deformation process
5. In uniaxial tensile test of a sample with rectangular cross-section, if uniform strain along loading direction is $\varepsilon_1$, then strains along plane of cross-section ($\varepsilon_2, \varepsilon_3$) are given by
   a. $\varepsilon_2 = 0; \varepsilon_3 = 0$
   b. $\varepsilon_2 = -\frac{\varepsilon_1}{2}; \varepsilon_3 = -\frac{\varepsilon_1}{2}$
   c. $\varepsilon_2 = \frac{\varepsilon_1}{2}; \varepsilon_3 = \frac{\varepsilon_1}{2}$
   d. $\varepsilon_2 = \varepsilon_1; \varepsilon_3 = \varepsilon_1$
6. If the stress-strain plot for a material is given as below, which statement is true:
   a. Stress strain behavior is given by $\sigma = K\varepsilon^n$
   b. Plastic strain is zero
   c. Elastic strain is zero
   d. There is no strain hardening in the material

7. In wire drawing operation, if area reduction ratio $\left( = \frac{A_0 - A_f}{A_0} \right)$ is given as 0.3, what is Y.S. of the rolled material if its plastic behavior is expressed as $\sigma = 500\varepsilon^{0.5}$
   a. 500 MPa
   b. 250 MPa
   c. 299 MPa
   d. 200 MPa

8. Which of the following is NOT true regarding power law behavior ($\sigma = K\varepsilon^n$)
   a. Describes flow stress behavior for all strains
   b. Describes flow stress behavior only until UTS
   c. Describes flow stress behavior beyond a certain minimum strain
   d. Flow stress increases with increasing strain

9. A material has yield strength of 420 MPa at a strain rate of $10^{-3}$ s$^{-1}$. If material behavior is given by $\sigma = C\dot{\varepsilon}^m$, where m=0.01. Find yield strength if the same material was given same strain at a strain rate of $10^4$ s$^{-1}$
   a. 493 MPa
   b. 420 MPa
   c. 220 MPa
   d. 100 MPa

10. Which of the following is NOT true regarding Zener Hollomon parameter
   a. Combines effect of strain-rate $\dot{\varepsilon}$ and Temperature T.
   b. Ln ($\dot{\varepsilon}$) versus 1/T is a straight line
   c. If different combination of $\dot{\varepsilon}$ and T give same Z, then these will also produce same flow stress.
   d. $Z = \dot{\varepsilon}\exp(-Q/RT)$