

Quiz

1. Define hardness. What is Mohs scale of hardness?
2. Why it is necessary to specify load-indenter combination in Rockwell hardness test?
3. How is Brinell hardness measured. Show that BHN varies as P/D^2 where P is the load and D is the indenter diameter.
4. Why is the included angle between opposite faces of the Vickers indenter 136° ?
5. What is microhardness? Why sometime it is necessary?
6. What is engineering stress and strain?
7. What is Hook's law?
8. What is elastic and proportional limit?
9. How is the elastic modulus measured from the stress-strain curve?
10. What is yield stress?
11. What is 0.2% proof stress?
12. How is the ductility measured?
13. What is ductile and brittle behavior?
14. What is resilience? What is toughness?
15. What is true stress and strain. Deduce the relationship between true and engineering stress and strain.
16. Why does the engineering stress-strain curve peak and drop where as the true stress-strain curve keep on going up?
17. What is a flow curve?
18. What is shear stress and strain
19. What is Poisson's ratio?
20. What are structure-sensitive and structure insensitive properties?
21. What is Poisson's ratio?
22. A 15 mm long and 120 mm dia cylindrical rod is subjected to a tensile load of 35 kN. It must not experience either plastic deformation or a diameter reduction of more than 0.012 mm. Which of the listed materials is suitable for such a requirement and why? Al ($E= 70$ GPa, $YS = 250$ MPa, $\nu = 0.33$), Ti ($E= 105$ GPa, $YS = 850$ MPa, $\nu = 0.36$), Steel ($E= 205$ GPa, $YS = 550$ MPa, $\nu = 0.27$), Mg ($E= 45$ GPa, $YS = 170$ MPa, $\nu = 0.35$).
23. A metal experiences a true strain of 0.1 at a true stress of 415 MPa. What is the strain hardening exponent of the metal? $K = 1035$ MPa. What will be the true strain at a stress of 600 MPa?