

Questions for self-assessment

1. What is the need to study about heat flow in welding?
2. How does heat flow in welding affect the performance of weld joints?
3. What is weld thermal cycle and how does it affect mechanical properties of weld joints?
4. What information can be obtained from the weld thermal cycle of a location?
5. Describe effect of various factors related with welding on weld thermal cycle of a location?
6. What is importance of the cooling rate during welding of hardenable steel?
7. How can cooling rate in HAZ during welding of plates of different thicknesses be obtained?
8. Describe methodology to establish the critical cooling rate for steel under a given set of welding conditions.
9. How does welding speed affect cooling rate and temperature gradient in HAZ?
10. What are the welding parameters affecting the cooling rate during welding?
11. How can cooling rate equations be used for development of sound weld joints of steel?
12. What is importance of the peak temperature of HAZ during welding of hardenable steel?
13. How can peak temperature of HAZ during welding be obtained?
14. Explain the effect of welding parameters on heat distribution and pool shape.
15. How can peak temperature equation be used for development of sound weld joints of steel?
16. Describe factors affecting the width of HAZ?
17. What is solidification time and how does it affect soundness and performance of the weld joint?
18. How the solidification time for a weld can be obtained?

19. Describe the factors affecting the solidification time?
20. What is the relationship between solidification time and weld structure?
21. Define residual stress in weld joints?
22. Explain the mechanism of residual stress development in weld joints?
23. How do residual stresses affect the performance of weld joints?
24. Describe methods used to control residual stress in weld joints?
25. What are factors affecting the development residual stress in weld joint?
26. How do welding process and related parameters affect the residual stress development in weld joints?
27. What is the effect of weld joint design on residual stress?
28. How do preheating and post heating influence the residual stresses in weld joints?
29. How does residual stress in multi-pass welds differ from that is a single pass weld?