

Questions for self assessment

1. What is mechanism of development of a welding arc?
2. Explain mechanisms of electron emission by a) thermionic emission method, b) field emission method and c) secondary emission.
3. Describe different zones in which a welding arc can be divided.
4. Schematically show variation in potential drop as a function of distance from cathode to anode and explain why?
5. Explain the effect of electrical parameters namely voltage and current on power of the welding arc and heat generation.
6. What are methods of arc initiation?
7. Explain the mechanism of arc initiation by touch start and field start methods.
8. What are the conditions necessary for maintenance of welding arc?
9. Explain the two approaches used for maintenance of the AC welding arc.
10. What is arc characteristic?
11. Describe different zones of arc characteristics curve namely drooping, flat and rising zones.
12. How is arc characteristic affected by arc length?
13. Describe the temperature variation in welding arc.
14. What are factors affecting temperature in welding arc?
15. What is the role of arc forces in development of sound weld joint?
16. Describe various forces the acting in arc zone.
17. What are factors affecting the forces in arc region?
18. Describe role of polarity on heat generation during DC welding.
19. What is straight (DCEN) and reverse (DCEP) polarity in DC welding?
20. How does polarity affect the arc stability and cleaning action during welding?
21. What is arc blow? How does arc blow affect the welding?
22. Explain the mechanism of arc bow?
23. What are causes of arc blow? What steps can be taken to control the arc blow?
24. Define arc efficiency. What are the factors affecting the arc efficiency?

25. Why do consumable arc welding processes offer higher arc efficiency than non-consumable arc welding processes?
26. Electroslag welding of 50-mm-thick steel plates was performed using current 480A and voltage 34 V. The heat losses to the water-cooled copper shoes and by radiation from the surface of the slag pool were 1275 and 375 cal/s respectively. Calculate the heat source efficiency.
27. Establish the equation of arc efficiency for consumable and non-consumable arc welding processes.
28. What is metal transfer? How does metal transfer affect the development of sound weld joints?
29. Explain the mechanism of different modes of metal transfer during consumable arc welding processes?
30. Describe the factors affecting the mode of metal transfer?
31. Enlist the welding conditions and positions where different modes of metal transfer are preferred.
32. How can we control the melting rate during consumable arc welding processes?
33. Explain the factors limiting the melting rate in different consumable arc welding processes.