



## **LEAD FREE CONVERSION IN ELECTRONICS ASSEMBLY TRAINING CERTIFICATION TEST (DVD-99C)**

**This test consists of twenty multiple-choice questions. All questions are from the video: *Lead Free Conversion in Electronics Assembly (DVD-99C)*.**

**Each question has only one *most* correct answer. Circle the letter corresponding to your selection for each test item. If you wish to change an answer, erase your choice completely.**

**You should read through the questions and answer those you are sure of first. After your first pass through the test, then go back and answer the questions that you were not sure of. If two answers appear to be correct, pick the answer that seems to be the most correct response.**

**When you are finished, check to make sure you have answered all of the questions. Turn in the test materials to the instructor.**

**The passing grade for this test is 70% (14 correct answers or better).**

**Good luck!**



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Name \_\_\_\_\_ Date \_\_\_\_\_

- 1. The melting point for tin-lead solder is**
  - a. 150 degrees C
  - b. 183 degrees C
  - c. 217 degrees C
  - d. 227 degrees C
  
- 2. The melting point for lead free solder is typically**
  - a. 20 degrees C higher than tin-lead
  - b. 30 degrees C higher than tin-lead
  - c. 40 degrees C higher than tin-lead
  - d. 50 degrees C higher than tin-lead
  
- 3. The most common lead free alloy is**
  - a. tin-silver-copper
  - b. tin-silver-bismuth
  - c. tin-silver
  - d. tin-copper
  
- 4. Tin-copper is typically used for**
  - a. hand soldering
  - b. wave soldering
  - c. reflow soldering
  - d. all of the above
  
- 5. A consideration in implementing a lead free process is**
  - a. components and circuit boards need to withstand higher soldering temperatures
  - b. moisture sensitive devices may be more at risk
  - c. higher activity fluxes may be required
  - d. all of the above
  
- 6. When lead free and tin-lead solders are mixed, there will be**
  - a. cross contamination
  - b. a mixed technology assembly
  - c. reliable solder connections
  - d. hybrid solder connections

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- 7. The visual appearance of the lead free solder joints is**
- a. smoother than tin-lead
  - b. shinier than tin-lead
  - c. grainier than tin-lead
  - d. wetter than tin-lead
- 8. A target lead free solder joint will**
- a. have a fillet that is curved inward, or concave
  - b. have a texture that is a little grainy
  - c. reveal the outline of the lead or termination beneath the solder
  - d. all of the above
- 9. Non-wetting occurs when**
- a. the solder has not adhered to either the termination or land
  - b. the reflow or wave soldering temperature is too low
  - c. there is poor flux activity
  - d. all of the above
- 10. A convex fillet with solder flowing over the edge of the land indicates**
- a. excessive solder
  - b. dewetting
  - c. a blowhole
  - d. tombstoning
- 11. A solder bridge is**
- a. a crossing within the grain structure of the solder alloy
  - b. an electrical path, or short circuit that was not intended
  - c. a leaching of the solder or flux between two adjacent lands
  - d. an arched connection between opposite sides of the connection
- 12. The reason for the switch to lead free solder is**
- a. Europe's legal mandate to change by July 1, 2006
  - b. to keep lead out of the landfills
  - c. reduce manufacturing pollution
  - d. all of the above
- 13. The most common method of absorbing lead into our systems is**
- a. being touched by others who have handled tin-lead solder
  - b. touching circuit boards
  - c. ingesting lead by touching food or make-up after handling tin-lead solder
  - d. breathing in airborne fumes or particles

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- 14. An example of a moisture sensitive device is a**
  - a. BGA
  - b. PLCC
  - c. QFP
  - d. all of the above
  
- 15. The reason MSDs are at greater risk in a lead free process is**
  - a. lead free solder contains more moisture
  - b. the higher soldering temperatures
  - c. cross contamination
  - d. all of the above
  
- 16. A sealed moisture barrier bag**
  - a. will restrict the transmission of water vapor
  - b. is completely waterproof
  - c. should never be opened
  - d. displays the relative humidity within the package
  
- 17. Desiccant is**
  - a. a popular variation of the tin-silver-copper alloy
  - b. a card that displays the relative humidity absorbed by an MSD
  - c. a moisture absorbent material
  - d. the cause of delamination of internal interfaces
  
- 18. The FIFO system of MSD storage and retrieval ensures that**
  - a. moisture barrier bags are opened during kitting
  - b. humidity indicator cards are examined
  - c. older components are used before newer ones to minimize shelf life
  - d. all of the above
  
- 19. When the humidity indicator card exceeds its specified limit, the MSDs**
  - a. must be soldered as quickly as possible
  - b. will need to go through a baking operation before being soldered
  - c. will need to be put into a new moisture barrier bag and returned to storage
  - d. will need to be returned to the manufacturer
  
- 20. Floor life indicates**
  - a. the time a component can be safely exposed to a factory environment before soldering
  - b. the level of activity on the production floor
  - c. the reliability criteria for a finished assembly
  - d. all of the above