Induction Foundry Safety Fundamentals Test

NAME (PRINT): _____ **DATE:** _____

COMPANY:_____

DEPARTMENT:_____

Please Note The Following:

These questions are of a general nature and do not take the place of proper safety training. Nor do these questions imply that these topics are any more important than anything else found in the safety training documents and video.

This test is to be used at each foundry's discretion to determine if personnel being trained have read and understood all safety training documentation.

All foundry personnel must be trained and retrained on all related safety matters at least once a year.

By signing below, I confirm that I have reviewed the safety documents provided by my employer, have been thoroughly trained, and acknowledge that I need to be properly retrained at least once a year. I also agree to take the following test to determine if I have read and understood the safety materials.

SIGNATURE: _____ **DATE:** _____

1. Equipment must only be operated by _____ personnel who have _____ all _____ .

2. Personnel with artificial organs, joints or plates, or similar objects must _____ _____. Personnel with cardiac pacemakers are particularly at risk and must stay well away from _____ .

3. Induction melting equipment must not be _____ if any safety systems are jumpered, bypassed, or non-operational.

4. Personnel in proximity to molten metal must wear _____

5. OSHA's Personal Protective Equipment Part 29 CFR (1910.132) states, "The employer shall assess the workplace to _____, which necessitate the use of Personal Protective Equipment (PPE)."

6. Wear appropriate respirators when working with dry powders and installing or removing refractories. Respirators must _____ .

7. There are three ways to help protect people from the dangers of molten metal. These are:
   a. _____
   b. _____
   c. _____ .

8. All material charged into the furnace must be _____. Bundled or baled scrap must be dried to eliminate _____ before adding it to the melt.

9. During normal pours, sparks and metal splash can _____ causing serious injury if workers are not properly protected.

10. Primary causes of metal splash and furnace eruptions are:

a. _____ c. _____

b. _____ d. _____

11. Any event that interferes with normal furnace cooling can quickly lead to coil damage and may lead to a catastrophic explosion. Therefore, induction furnaces must have a _____ that can be engaged if normal pump operation fails.

12. Water cooling is crucial to the safe operation of induction furnaces and power supplies, no system should be operated without functioning _____ and _____, which must not be bypassed.

13. Never clean out water lines with compressed air while the [ ]. The air will displace the cooling water and the system will overheat rapidly.

14. Improper [ ] of the furnace may result in bridging. Bridging can be minimized by using [ ] and by making sure the different sizes of charge material are added correctly. If a bridge occurs, power must be [ ]. All personnel must be evacuated from the furnace area until enough time has elapsed to [ ].

15. Metal poured into a pit or runout area where moisture, standing water, oils or other fluids are present can cause [ ]. Only [ ] spill pits can safely contain a runout or emergency furnace dumping. Furnaces must not be operated if their spill pits are [ ]!

16. Do not operate the furnace with the furnace ground probes [ ] from the furnace ground. The integrity of the probes or the wire cages must be checked frequently and never operate the melting equipment with a faulty ground detection system. In case of a ground fault trip, the melt deck around the furnace must be [ ].

17. [ ] refers to established practices and procedures to safeguard employees from the unexpected startup of equipment or the release of hazardous energy during service or maintenance activities.

18. Follow proper [ ] procedure before servicing equipment. Some equipment may need to be discharged and pressure bled off or areas secured before servicing may begin. Always refer to specific equipment manuals before beginning maintenance on equipment.

19. The following components must be inspected during each [ ] or every [ ] whichever comes first (at minimum): structure/welds, hardware, hydraulics/pneumatics, water hoses, bearings, water cooled power cables and protective barriers. Under no circumstances should the inspections be performed if the equipment [ ].

20. The furnace hydraulic system provides motive power to perform a number of functions. General cleanliness at the hydraulic connections is critical and the system must be inspected daily and any leaking components [ ] or [ ]

21. VITON seals, while safe under designed operating conditions, have been found to decompose if exposed to [ ]. This newly formed hydrofluoric acid is extremely corrosive and almost impossible to remove from human tissue. When inspecting equipment exposed to [ ], check if any gaskets, seals or “O” rings have suffered from decomposition. These will appear as a charred or black sticky mess. You must not touch either the seal or the equipment until it has been decontaminated.

22. Always watch for [ ] equipment. No one should be on or near the charging, melting or pouring equipment when they are in motion. The lift, tilt, indexing and swing movements could injure bystanders.

23. Failure to ensure that ground probe wires are in contact with the lining form or crucible could result in [ ] during operation and could render the molten leak detector system inoperable.

24. Monitor normal lining wear. In theory, refractory wear should be uniform but in practice this never occurs. The most intense wear occurs:
    a. [ ]
    b. [ ]
    c. [ ]

25. To prevent a runout the integrity of the furnace lining must be maintained. Should actual furnace conditions heat or cool the lining beyond its specified range, the resulting thermal shock can [ ]

26. Power to the furnace must be turned off whenever any process involving contact with the metal bath, such as taking samples, checking metal temperature or slagging is taking place. This is to prevent [ ] if safety systems should fail and the bath is in conductive contact with the induction coil.

27. If the power supply energizes more than one furnace, leads to the furnace undergoing maintenance or repair must be [ ] and the furnace induction coil [ ] .

28. Test the measurement equipment for proper operation and measurement settings. All capacitors must be checked for [ ] before doing any work inside the cabinet. Wait [ ] after opening a circuit interrupter before opening cabinet doors. Capacitors require time to discharge.

29. Furnace inspection covers must never be removed and left off the furnace while the furnace is operating. Failure to reinstall can result in electrical shock and/or arcing due to [ ] coming in contact with the coil.

30. All uncovered floor holes must be [ ] .

31. It is mandatory that the [ ] or installation, curing, day-to-day maintenance and start up are followed. Refractory [ ] must be properly controlled by using [ ] during the sintering process.