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List number of hours worked on assignment must match State requirement. _____

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Basic Welding Answer Key

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**BASIC WELDING
CEU TRAINING COURSE**

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Welding Introduction

1. Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, _____, friction, and ultrasound. While often an industrial process, welding may be performed in many different environments, including in open air, under water, and in outer space.

- A. Hazardous activiti(es)
- B. Forge welding
- C. An electron beam
- D. Inexpensive joining methods
- E. Brazing
- F. None of the Above

2. Welding is a _____ and precautions are required to avoid burns, electric shock, vision damage, inhalation of poisonous gases and fumes, and exposure to intense ultraviolet radiation.

- A. Welding environment fire(s)
- B. Hot metal shower
- C. Hazardous undertaking
- D. Hazardous activiti(es)
- E. Great career
- F. None of the Above

3. Until the end of the 19th century, the only welding process was forge welding, which blacksmiths had used for centuries to join iron and steel by?

- A. Hazardous activiti(es)
- B. Forge welding
- C. Heating and hammering
- D. Inexpensive joining methods
- E. Welding, cutting, and brazing
- F. None of the Above

4. Arc welding and oxyfuel welding were among the first processes to develop late in the century, and _____ followed soon after.

- A. Welding environment fire(s)
- B. Hot metal shower
- C. Electric resistance welding
- D. Arc welding and oxyfuel welding
- E. Intense ultraviolet radiation
- F. None of the Above

5. Which of the following terms advanced quickly during the early 20th century as World War I and World War II drove the demand for reliable and inexpensive joining methods?

- A. Hazardous activiti(es)
- B. Forge welding
- C. Arc eye or flash burns
- D. Welding technology
- E. Welding, cutting, and brazing
- F. None of the Above

**Background
Cutting**

6. Gas and arc welding equipment can also be used for cutting metals. In fact, oxyacetylene gas and arc cutting cause more _____ than any other means.

- A. Welding environment fire(s)
- B. Hot metal shower
- C. Joint
- D. Arc welding and oxyfuel welding
- E. Intense ultraviolet radiation
- F. None of the Above

7. Oxyacetylene gas cutting is similar to oxyacetylene welding, except that the blowpipe is fitted with a cutting attachment and work is done at a greater pressure. The effect is quite dramatic as sparks of hot metal shower from the work. These sparks provide a?

- A. Hazardous activiti(es)
- B. Forge
- C. Arc burn
- D. Potential ignition source for a fire
- E. Welding, cutting, and brazing fire
- F. None of the Above

8. Arc cutting is similar to arc welding, except that special electrodes are used and the molten metal is _____. The electrodes are coated with an insulating material which does not conduct electricity, and hence they are non-consumable, unlike in arc welding where the electrodes are used up.

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Either oxidized or blown away
- E. Toxic exposure
- F. None of the Above

Gas Welding

9. Oxyacetylene welding (a form of gas welding) is the oldest type of welding and was developed at the beginning of the twentieth century. Oxygen and acetylene are fed into a torch and ignited to produce a _____ with a temperature of around 3000 degrees C.

- A. Hazardous activiti(es)
- B. Forge welding
- C. Arc eye or flash burns
- D. Inexpensive joining methods
- E. Burning gas
- F. None of the Above

10. The welder has good control of the weld, as they hold the oxyacetylene torch in one hand and a _____ in the other. The heat of the torch causes the filler metal to gradually fuse with the joint.

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Rod of filler metal
- E. Toxic exposure
- F. None of the Above

Welding Safety Section

11. Welding, cutting, and brazing are hazardous activities that pose a unique combination of _____ to more than 500,000 workers in a wide variety of industries.

- A. Both safety and health risks
- B. Manganese welding fumes
- C. An explosion and fire risk
- D. Dangerous gases and particulate matter
- E. Extreme heat and flames
- F. None of the Above

12. The risk from _____ alone is more than four deaths per thousand workers over a working lifetime.

- A. Combustible materials
- B. Nano particles
- C. Manganese welding fumes
- D. Extreme heat and flames
- E. Dangerous gases and particulate matter
- F. None of the Above

13. Which of the following terms are addressed in specific standards for the general industry, shipyard employment, marine terminals, and construction industry?
- A. Natural drafts
 - B. Plume source
 - C. Fume and gases
 - D. Maximum amount of fume and gases
 - E. Welding, cutting, and brazing
 - F. None of the Above

Welding Safety Issues

14. To prevent injury, welders wear personal protective equipment in the form of heavy leather gloves and protective long sleeve jackets to avoid exposure to?

- A. Both safety and health risks
- B. Manganese welding fumes
- C. An explosion and fire risk
- D. Dangerous gases and particulate matter
- E. Extreme heat and flames
- F. None of the Above

15. Which of the following terms leads to a condition called arc eye or flash burns in which ultraviolet light causes inflammation of the cornea and can burn the retinas of the eyes?

- A. Hazardous activiti(es)
- B. Forge welding
- C. Arc eye or flash burns
- D. The brightness of the weld area
- E. Welding, cutting, and brazing
- F. None of the Above

16. Welders are often exposed to dangerous gases and?

- A. Combustible materials
- B. Nano particles
- C. Manganese welding fumes
- D. Extreme heat and flames
- E. Particulate matter
- F. None of the Above

17. Processes like flux-cored arc welding and shielded metal arc welding produce smoke containing particles of?

- A. Both safety and health risks
- B. Manganese welding fumes
- C. An explosion and fire risk
- D. Various types of oxides
- E. Extreme heat and flames
- F. None of the Above

18. Exposure to _____, for example, even at low levels (<0.2 mg/m³), may lead to neurological problems or to damage to the lungs, liver, kidneys, or central nervous system.

- A. Combustible materials
- B. Nano particles
- C. Manganese welding fumes
- D. Extreme heat and flames
- E. Dangerous gases and particulate matter
- F. None of the Above

19. Which of the following terms can become trapped in the alveolar macrophages of the lungs and induce pulmonary fibrosis?

- A. Both safety and health risks
- B. Manganese welding fumes
- C. Nano particles
- D. Dangerous gases and particulate matter
- E. Extreme heat and flames
- F. None of the Above

20. Which of the following terms in many welding processes poses an explosion and fire risk. Some common precautions include limiting the amount of oxygen in the air, and keeping combustible materials away from the workplace.

- A. Combustible materials
- B. Compressed gases and flames
- C. Manganese welding fumes
- D. Extreme heat and flames
- E. Dangerous gases and particulate matter
- F. None of the Above

Whose responsibility is fire safety in welding?

21. To reduce the risk and minimize the damage of fire, personnel involved in welding/cutting operations should cooperate in taking adequate precautions and?

- A. Fire-safe
- B. Extinguishers and blankets
- C. Periodic fire drills
- D. Pursuing safe practices
- E. Adequate firefighting equipment
- F. None of the Above

22. Supervisors- verify that safety equipment is present and properly maintained; ensure workers are correctly trained on safety aspects of their work, especially what to do in the case of a fire. Ensure the working environment is _____, especially the removal of flammable materials, arrange firewatchers.

- A. Fire-safe
- B. Extinguishers and blankets
- C. Mark hot metal
- D. Periodic fire drills
- E. Adequate firefighting equipment
- F. None of the Above

23. Workers- follow safe practices, report unsafe conditions, mark hot metal and _____ if conditions change and become unsafe.

- A. Fire-safe
- B. Extinguishers and blankets
- C. Periodic fire drills
- D. Stop work
- E. Adequate firefighting equipment
- F. None of the Above

24. Workers and supervisors- should be properly trained in the correct use of firefighting equipment such as extinguishers and?

- A. Fire-safe
- B. Blankets
- C. Mark hot metal
- D. Periodic fire drills
- E. Adequate firefighting equipment
- F. None of the Above

25. To minimize injuries/loss of life, they should also be shown where the _____ are, and how to use them in an emergency. A good method of doing this is to have periodic fire drills.

- A. Fire-safe
- B. Extinguishers and blankets
- C. Periodic fire drills
- D. Fre exits
- E. Adequate firefighting equipment
- F. None of the Above

26. To reduce fire hazards, workers and supervisors should also be made aware what _____ should be shut down before leaving the work area.

- A. Fire-safe
- B. Extinguishers and blankets
- C. Periodic fire drills
- D. Mark hot metal
- E. Adequate firefighting equipment
- F. None of the Above

Oxyacetylene Gas Welding

27. There are some special precautions which should be taken when welding or cutting with _____ to reduce the risk of fire.

- A. Natural drafts
- B. Oxyacetylene gas
- C. Fume and gases
- D. Maximum amount of fume and gases
- E. Toxic exposure
- F. None of the Above

Backfire

28. Which of the following terms is when the flame flashes back up the nozzle and is arrested at the mixer or injector in the blowpipe body?

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Backfire
- E. Hazard of the material
- F. None of the Above

29. Which of the following terms may be caused by using a dirty tip, an overheated tip, or working at insufficient pressure?

- A. Backfires
- B. Plume source
- C. Fume and gases
- D. Flashback
- E. Toxic exposure
- F. None of the Above

Flashback

30. Which of the following terms is when the flame burns back into the tip, torch, hose, or regulator?

- A. Backfire(s)
- B. Plume source
- C. Fume and gases
- D. Flashback
- E. Toxic exposure
- F. None of the Above

31. Which of the following terms occurs, the oxygen torch valve should be turned off quickly and then the fuel gas torch valve?

- A. Backfire(s)
- B. Plume source
- C. Fume and gases
- D. Flashback
- E. Toxic exposure
- F. None of the Above

32. Acetylene gas itself, although bottled at relatively low pressure, is highly explosive. If it leaks into a confined space, nothing will happen until there is a spark or flame to ignite it. Then it may explode similarly to?

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Hazards of the materials
- F. None of the Above

Arc welding Electrical Safety

33. As arc welding involves electricity and high currents, these may create special fire and safety hazards. Prior to the commencement of a welding project, it is important to ground all electrical equipment. This is to reduce the risk of _____ or the transformer causing an electrical fire by triggering the electrical supply circuit protection.

- A. Electrical shock
- B. Voltage settings
- C. Welding arc
- D. Spray
- E. Higher amounts of special additives
- F. None of the Above

Conclusion

34. Welding and cutting metals by various methods especially oxyacetylene gas and arc welding produces very hot fragments of metal, or ‘ _____ ’ and thus pose a dangerous fire hazard.

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Hazards of the materials
- F. None of the Above

35. Which of the following terms is caused by these types of fires, especially fires caused by cutting, and often these fires could have been prevented, or the amount of damage reduced, by taking precautions and undertaking fire-safe welding practices.

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Maximum amount of fume and gases
- E. Toxic exposure
- F. None of the Above

Reducing exposure to welding fume

36. Welders should understand the _____ they are working with. OSHA’s Hazard Communication standard requires employers to provide information and training for workers on hazardous materials in the workplace.

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Hazards of the materials
- F. None of the Above

37. Welding surfaces should be cleaned of any coating that could potentially create toxic exposure, such as?

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Solvent residue and paint
- E. Toxic exposure
- F. None of the Above

38. Workers should position themselves to avoid breathing _____. For example, workers should stay upwind when welding in open or outdoor environments.

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Welding fume and gases
- F. None of the Above

39. General ventilation, the natural or forced movement of fresh air, can reduce fume and gas levels in the work area. Welding outdoors or in open work spaces does not guarantee adequate ventilation. In work areas without _____, welders should use natural drafts along with proper positioning to keep fume and gases away from themselves and other workers.

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Ventilation and exhaust systems
- E. Toxic exposure
- F. None of the Above

40. Local exhaust ventilation systems can be used to remove _____ from the welder’s breathing zone.

- A. Highly explosive
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Fume and gases
- F. None of the Above

41. Keep fume hoods, fume extractor guns and vacuum nozzles close to the plume source to remove the maximum amount of _____.

- A. Natural drafts
- B. Plume source
- C. Fume and gases
- D. Maximum amount of fume and gases
- E. Toxic exposure
- F. None of the Above

42. Portable or flexible exhaust systems can be positioned so that _____ are drawn away from the welder. Keep exhaust ports away from other workers.

- A. Fume and gases
- B. Sparks
- C. Flashes
- D. Something radically wrong
- E. Hazards of the materials
- F. None of the Above

Oxy-Acetylene Welding Section

43. Oxy-Acetylene welding equipment consists of two large tanks (one containing the oxygen and the other containing the acetylene); a regulator assembly at the top of each tank, a pair of hoses leading from the regulators to the torch handle and the _____.

- A. Neutral flame
- B. Lower flame
- C. Line pressure
- D. Amount of oxygen and acetylene
- E. Torch handle itself
- F. None of the Above

44. The first thing to do is adjust the line pressure, which is controlled by the large wing nut on the?

- A. Front of each regulator
- B. Lower flame
- C. Line pressure
- D. Two valves on the torch handle
- E. Amount of oxygen and acetylene
- F. None of the Above

45. No matter how you try, you cannot make a good weld unless you correctly adjust the torch. The difference between them is caused by the relationship between the _____ and acetylene, which is controlled by the two valves on the torch handle.

- A. Neutral flame
- B. Lower flame
- C. Line pressure
- D. Amount of oxygen
- E. Amount of oxygen and acetylene
- F. None of the Above

46. The flame you're after is the neutral flame which comes just as the _____ of the carburizing flame disappears into the inner cone.

- A. Neutral flame
- B. Lower flame
- C. Line pressure
- D. Amount of oxygen and acetylene
- E. Acetylene feather
- F. None of the Above

47. The correct intensity is determined by the thickness of the work and by how rapidly you move the puddle along. Beginners tend to do better with a _____ because it allows them to work more slowly.

- A. Neutral flame
- B. Lower flame
- C. Line pressure
- D. Amount of oxygen and acetylene
- E. Torch handle
- F. None of the Above

48. Angle the _____ toward the work with the rod coming in from the opposite direction. Once the puddle forms move the torch in circular or semicircular patterns across the weld as you slowly advance the puddle.

- A. Neutral flame
- B. Lower flame
- C. Flame
- D. Rod
- E. Amount of oxygen and acetylene
- F. None of the Above

Cast Iron "Welding"

49. Which of the following terms that are mainly nickel are used but there are cast iron rods available?

- A. Neutral flame
- B. Lower flame
- C. Filler rod(s)
- D. Skill
- E. Torch handle
- F. None of the Above

MIG Welding Section

50. MIG welding is an abbreviation for Metal Inert Gas Welding. It is a process developed in the 1940's, and is considered semi-automated. This means that the welder still requires _____, but that the MIG welding machine will continuously keep filling the joint being welded.

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Skill
- E. No shielding
- F. None of the Above

MIG Welding Names

51. When it was first developed it was called (GMA) Gas Metal Arc. It is also known as; GMAW or Gas Metal Arc Welding. Technically the differences in the names are the type of gas used, _____ versus non-inert gas.

- A. Inert gas
- B. Voltage settings
- C. Welding arc
- D. Spray
- E. Higher amounts of special additives
- F. None of the Above

How MIG Welding Works

52. MIG weld welding requires three things, electricity to produce heat, an electrode to fill the joint, and _____ to protect the weld from the air. MIG welding is done using a very small electrode that is fed continuously, while the operator controls the amount of weld being done. In some cases, when a robot takes over this process, it becomes automatic welding.

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Skill
- E. No shielding
- F. None of the Above

MIG Voltage Type and Welding Polarity

53. The power source used for MIG welding is called a "_____". In MIG welding the voltage is what is controlled and adjusted. When comparing MIG welding to Arc or TIG welding, MIG welding machines use voltage settings to set the machine. TIG and Arc welding machines use amperage to set the machine or a "constant amperage power supply".

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Spray
- E. Constant voltage power supply
- F. None of the Above

MIG Welding Gasses

54. MIG welding requires a shielding gas to be used. As the name states “Metal Inert Gas Welding” there is no shielding on the electrode or filler wire. MIG welding would not be possible without?

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Skill
- E. No shielding
- F. None of the Above

55. The way the _____ works is it is feed through the MIG gun and it literally suffocates the weld area from any air. This provides an air free zone where the welding arc and filler wire can do their work to get the joint welded.

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Spray
- E. Shielding gas
- F. None of the Above

MIG Welding Carbon Steel

56. Carbon steel welds are almost flawlessly done with a MIG welder. There are very few problems, beside the downside of the design of a MIG welding machine. The _____ is just right to pass through the liner from the machine with minimal friction to cause problems and has enough stiffness to be feed without coiling up.

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Skill
- E. No shielding
- F. None of the Above

57. Depending on how much voltage the MIG welding machine is running at, the weld can be set to one of three transfer types, _____, globular, or spray.

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Weld
- E. Short circuit
- F. None of the Above

Joint Setup and Preparation

Metal Preparation

58. Unlike _____, which have higher amounts of special additives, the solid MIG wire does not combat rust, dirt, oil or other contaminants very well. Use a metal brush or grinder and clean down to bare metal before striking an arc.

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Stick and Flux-Cored electrodes
- E. No shielding
- F. None of the Above

59. Make sure your work clamp connects to clean metal, too; any electrical impedance will affect wire feeding performance. To ensure strong welds on thicker metal, bevel the joint to ensure the weld fully penetrates to the _____. This is especially important for butt joints.

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Spray
- E. Base metal
- F. None of the Above

60. With MIG welding it is very critical that the weld area is clean. MIG welding will not be successful with a dirty joint. Unlike some stick welding / SMAW rods that can burn through rust, MIG welding has a lot of difficulties welding dirtier metals. It also does not have slag to protect the weld when the _____ is gone.

- A. Other contaminant
- B. Wire stiffness
- C. Shielding gas
- D. Gas
- E. No shielding
- F. None of the Above

61. When MIG welding make sure you have a clean joint by removing any foreign substance. With MIG welding a slight bit of dirt or rust is Okay but anything more is asking for trouble. MIG welding painted or _____ does not work well at all.

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Coated metals
- E. Higher amounts of special additives
- F. None of the Above

MIG Welding Summary

62. Carbon steel welds best with MIG because the _____ is perfect for the liner. MIG welding is the best choice for spot welding and tack welds. When welding soft metals like aluminum there is special equipment that is needed to be added to the MIG welder.

- A. Other contaminants
- B. Stiffness of the wire
- C. Shielding gas
- D. Stiffness of the rod
- E. Gun
- F. None of the Above

63. Harder metals like stainless steel work fine on any MIG welding machine as long as you pay attention to keeping the cord straight. Almost any metal can be MIG welded as long as the type of wire and _____ are properly chosen.

- A. Non-inert gas
- B. Voltage settings
- C. Welding arc
- D. Gun
- E. Gas
- F. None of the Above

Travel Angle

64. Travel angle is defined as the angle relative to the _____ in a perpendicular position. Normal welding conditions in all positions call for a travel angle of 5 to 15 degrees. Travel angles beyond 20 to 25 degrees can lead to more spatter, less penetration and general arc instability.

- A. Other contaminants
- B. Wire stiffness
- C. Shielding gas
- D. Gun
- E. No shielding
- F. None of the Above

Arc Welding Section

65. Arc welding is the most widely used form of welding as it is fast and produces _____. Arc welding is often used for commercial work.

- A. Arc welding processes
- B. Welding point
- C. Slag
- D. Rod of filler metal
- E. Strong welds
- F. None of the Above

66. An electric welding machine is used which consists of an electric circuit that produces a _____.

- A. New weld
- B. An electrode
- C. Electric circuit
- D. High current/low voltage output
- E. Shielding gas
- F. None of the Above

67. The electrode is a _____ and this metal is usually about the same composition as the metal being worked on.

- A. Arc welding processes
- B. Welding point
- C. Slag
- D. Rod of filler metal
- E. Electrode
- F. None of the Above

68. When the electrode is touched to the workpiece and slightly withdrawn, an arc (like a tiny lightning bolt) is produced. This happens because the two ends of the electric circuit are close enough for the current to jump the _____.

- A. New weld
- B. Gap
- C. Electric circuit
- D. Atmosphere
- E. Shielding gas
- F. None of the Above

69. The temperature of the arc is about 5500 degrees C which will melt most metals. As the arc is drawn along the joint, the tip of the electrode melts together with the _____. The most common form of arc welding is manual shielded metal arc welding.

- A. Arc welding processes
- B. Welding point
- C. Slag
- D. Rod of filler metal
- E. Electrode
- F. None of the Above

70. Which of the following terms is coated with chemicals which partly turn into gas and partly melt in the arc?

- A. New weld
- B. The electrode
- C. Electric circuit
- D. Atmosphere
- E. Shielding gas
- F. None of the Above

71. The melted chemicals are called a _____ which forms a protective blanket over the new weld.

- A. Arc welding process
- B. Welding point
- C. Slag
- D. Rod of filler metal
- E. Electrode
- F. None of the Above

72. Which of the following terms acts as a shield by keeping out the atmosphere?

- A. New weld
- B. An electrode
- C. Electric circuit
- D. The gas
- E. Shielding gas
- F. None of the Above

73. These processes use a welding power supply to create and maintain an electric arc between an electrode and the base material to melt metals at the?

- A. Arc welding processes
- B. Welding point
- C. Slag
- D. Rod of filler metal
- E. Electrode
- F. None of the Above

74. The welding region is sometimes protected by some type of inert or semi-inert gas, known as a _____, and filler material is sometimes used as well.

- A. New weld
- B. An electrode
- C. Electric circuit
- D. Rod of filler metal
- E. Shielding gas
- F. None of the Above

Arc Power Supply

75. To supply the electrical power necessary for arc welding processes, a variety of different _____ can be used.

- A. Arc welding processes
- B. Welding point
- C. Power supplies
- D. Rod of filler metal
- E. Electrode
- F. None of the Above

76. The most common welding power supplies are constant current power supplies and constant voltage power supplies. In arc welding, the length of the arc is directly related to the voltage, and the amount of _____ is related to the current.

- A. Heat input
- B. An electrode
- C. Electric circuit
- D. Atmosphere
- E. Shielding gas
- F. None of the Above

77. Constant current power supplies are most often used for manual welding processes such as gas tungsten arc welding and shielded metal arc welding, because they maintain a relatively constant current even as the _____ varies. This is important because in manual welding, it can be difficult to hold the electrode perfectly steady, and as a result, the arc length and thus voltage tend to fluctuate.

- A. Current
- B. Filler material
- C. Voltage
- D. Shielded metal arc welding
- E. Greater heat concentration
- F. None of the Above

78. Constant voltage power supplies hold the voltage constant and vary the current, and as a result, are most often used for automated welding processes such as _____, flux cored arc welding, and submerged arc welding. In these processes, arc length is kept constant, since any fluctuation in the distance between the wire and the base material is quickly rectified by a large change in current.

- A. GTAW
- B. Filler material
- C. Gas metal arc welding
- D. Arc welding
- E. Base material
- F. None of the Above

79. If the wire and the base material get too close, the _____ will rapidly increase, which in turn causes the heat to increase and the tip of the wire to melt, returning it to its original separation distance.

- A. Current
- B. Filler material
- C. Fumes and/or slag
- D. Shielded metal arc welding
- E. Greater heat concentration
- F. None of the Above

80. The type of current used plays an important role in arc welding. Consumable electrode processes such as shielded metal arc welding and gas metal arc welding generally use direct current, but the _____ can be charged either positively or negatively.

- A. GTAW
- B. Filler material
- C. Electrode
- D. Arc welding
- E. Base material
- F. None of the Above

81. In welding, the positively charged anode will have a _____, and as a result, changing the polarity of the electrode has an impact on weld properties.

- A. Current
- B. Filler material
- C. Fumes and/or slag
- D. Shielded metal arc welding
- E. Greater heat concentration
- F. None of the Above

82. If the _____ is positively charged, the base metal will be hotter, increasing weld penetration and welding speed. Alternatively, a negatively charged electrode results in more shallow welds.
- A. GTAW
 - B. Filler material
 - C. Electrode
 - D. Arc welding
 - E. Base material
 - F. None of the Above

Processes

83. Electric current is used to strike an arc between the base material and consumable electrode rod, which is made of filler material (typically steel) and is covered with a flux that protects the weld area from oxidation and contamination by producing _____ during the welding process.

- A. Current
- B. Filler material
- C. Fumes and/or slag
- D. Carbon dioxide (CO₂) gas
- E. Greater heat concentration
- F. None of the Above

84. Which of the following terms itself acts as filler material, making a separate filler unnecessary.

- A. GTAW
- B. Filler material
- C. The electrode core
- D. Arc welding
- E. Base material
- F. None of the Above

85. A related process, flux-cored arc welding (FCAW), uses similar equipment but uses wire consisting of a steel electrode surrounding a powder fill material. This cored wire is more expensive than the standard solid wire and can generate fumes and/or slag, but it permits even higher welding speed and?

- A. Greater metal penetration
- B. Filler material
- C. Fumes and/or slag
- D. Shielded metal arc welding
- E. Greater heat concentration
- F. None of the Above

86. Which of the following terms can be used on nearly all weldable metals, though it is most often applied to stainless steel and light metals. It is often used when quality welds are extremely important, such as in bicycle, aircraft and naval applications.

- A. GTAW
- B. Filler material
- C. Electrode
- D. Arc welding
- E. Base material
- F. None of the Above

87. A related process, plasma arc welding, also uses a tungsten electrode but uses plasma gas to make the arc. The arc is more concentrated than the _____, making transverse control more critical and thus generally restricting the technique to a mechanized process.

- A. GTAW arc
- B. Filler material
- C. Shielded metal arc welding (SMAW)
- D. Arc welding
- E. Submerged arc welding (SAW)
- F. None of the Above

88. Which of the following terms is a high-productivity welding method in which the arc is struck beneath a covering layer of flux. This increases arc quality, since contaminants in the atmosphere are blocked by the flux.

- A. GTAW
- B. Filler material
- C. Shielded metal arc welding (SMAW)
- D. Arc welding
- E. Submerged arc welding (SAW)
- F. None of the Above

89. Which of the following terms forms on the weld generally comes off by itself, and combined with the use of a continuous wire feed, the weld deposition rate is high?

- A. Puddle
- B. Weld deposition rate
- C. Atmospheric contamination
- D. MIG welding
- E. Single pass welding process
- F. None of the Above

90. Working conditions are much improved over other arc welding processes, since the _____ hides the arc and almost no smoke is produced. The process is commonly used in industry, especially for large products and in the manufacture of welded pressure vessels.

- A. Slag
- B. Consumable electrode
- C. Atmospheric contamination
- D. Flux
- E. An argon-based shielding gas
- F. None of the Above

Some of the best known welding methods include:

91. Which of the following terms - also known as "stick welding", uses an electrode that has flux, the protectant for the puddle, around it. The electrode holder holds the electrode as it slowly melts away.

- A. GTAW
- B. Filler material
- C. Shielded metal arc welding (SMAW)
- D. Arc welding
- E. Submerged arc welding (SAW)
- F. None of the Above

92. Which of the following terms protects the weld puddle from atmospheric contamination.

- A. Slag
- B. Consumable electrode
- C. Atmospheric contamination
- D. Flux
- E. An argon-based shielding gas
- F. None of the Above

93. Which of the following terms - also known as TIG (tungsten, inert gas), uses a non-consumable tungsten electrode to produce the weld. The weld area is protected from atmospheric contamination by an inert shielding gas such as Argon or Helium.

- A. Gas metal arc welding (GMAW)
- B. Gas tungsten arc welding (GTAW)
- C. Shielded metal arc welding (SMAW)
- D. Arc welding
- E. Submerged arc welding (SAW)
- F. None of the Above

94. Which of the following terms - commonly termed MIG (metal, inert gas), uses a wire feeding gun that feeds wire at an adjustable speed and flows an argon-based shielding gas or a mix of argon and carbon dioxide (CO₂) over the weld puddle to protect it from atmospheric contamination.

- A. Gas metal arc welding (GMAW)
- B. Gas tungsten arc welding (GTAW)
- C. Shielded metal arc welding (SMAW)
- D. Flux-cored arc welding (FCAW)
- E. Submerged arc welding (SAW)
- F. None of the Above

95. Which of the following terms - almost identical to MIG welding except it uses a special tubular wire filled with flux; it can be used with or without shielding gas, depending on the filler.

- A. Gas metal arc welding (GMAW)
- B. Gas tungsten arc welding (GTAW)
- C. Shielded metal arc welding (SMAW)
- D. Flux-cored arc welding (FCAW)
- E. Submerged arc welding (SAW)
- F. None of the Above

96. Which of the following terms - uses an automatically fed consumable electrode and a blanket of granular fusible flux. The molten weld and the arc zone are protected from atmospheric contamination by being "submerged" under the flux blanket.
- A. Gas metal arc welding (GMAW)
 - B. Gas tungsten arc welding (GTAW)
 - C. Shielded metal arc welding (SMAW)
 - D. Flux-cored arc welding (FCAW)
 - E. Submerged arc welding (SAW)
 - F. None of the Above

Resistance Welding

97. Resistance welding involves the generation of heat by passing current through the _____ caused by the contact between two or more metal surfaces.
- A. Puddle
 - B. Weld deposition rate
 - C. Atmospheric contamination
 - D. Resistance
 - E. Single pass welding process
 - F. None of the Above

Energy Beam

98. Energy beam welding methods, namely laser beam welding and _____, are relatively new processes that have become quite popular in high production applications. The two processes are quite similar, differing most notably in their source of power.
- A. Thermal cracking
 - B. Laser beam welding
 - C. Ultrasonic welding
 - D. Electron beam welding
 - E. Explosion welding
 - F. None of the Above

Solid-State

99. Like the first welding process, _____, some modern welding methods do not involve the melting of the materials being joined. One of the most popular, ultrasonic welding is used to connect thin sheets or wires made of metal or thermoplastic by vibrating them at high frequency and under high pressure.
- A. Thermal cracking
 - B. Forge welding
 - C. Ultrasonic welding
 - D. Electron beam welding
 - E. Explosion welding
 - F. None of the Above

Geometry

100. Welds can be geometrically prepared in many different ways. The five basic types of weld joints are the _____, lap joint, corner joint, edge joint, and T-joint (a variant of this last is the cruciform joint).
- A. Fillet
 - B. Butt joint
 - C. Base joint
 - D. Weld(s)
 - E. Filler joint
 - F. None of the Above

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