

**Registration form**

**Basic Welding CEU Training Course \$100.00  
48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

**Start and finish dates:** \_\_\_\_\_  
*You will have 90 days from this date in order to complete this course*

**List number of hours worked on assignment must match State requirement.** \_\_\_\_\_

**Name** \_\_\_\_\_ **Signature** \_\_\_\_\_  
*I have read and understood the disclaimer notice on page 2. Digitally sign XXX*

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I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

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**Instructions.** When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course: \_\_\_\_\_

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2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on \_\_\_\_\_. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
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## **Basic Welding Answer Key**

**Name** \_\_\_\_\_

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You can also fill this assignment out electronically in Adobe Acrobat DC

***Please circle, underline, bold or X only one correct answer  
A felt tipped pen works best.***

1. A B	16. A B C D	31. A B	46. A B C D
2. A B C D	17. A B C D	32. A B C D	47. A B C D
3. A B C D	18. A B C D	33. A B C D	48. A B C D
4. A B C D	19. A B C D	34. A B	49. A B C D
5. A B	20. A B C D	35. A B C D	50. A B C D
6. A B C D	21. A B C D	36. A B C D	51. A B C D
7. A B C D	22. A B C D	37. A B C D	52. A B
8. A B C D	23. A B	38. A B C D	53. A B
9. A B C D	24. A B	39. A B C D	54. A B C D
10. A B C D	25. A B C D	40. A B C D	55. A B C D
11. A B	26. A B C D	41. A B C D	56. A B C D
12. A B C D	27. A B	42. A B C D	57. A B C D
13. A B C D	28. A B C D	43. A B	58. A B C D
14. A B C D	29. A B	44. A B C D	59. A B C D
15. A B C D	30. A B C D	45. A B C D	60. A B C D

61. A B C D	71. A B C D	81. A B C D	91. A B C D
62. A B C D	72. A B C D	82. A B C D	92. A B C D
63. A B C D	73. A B C D	83. A B C D	93. A B C D
64. A B C D	74. A B C D	84. A B C D	94. A B C D
65. A B	75. A B	85. A B C D	95. A B C D
66. A B C D	76. A B C D	86. A B C D	96. A B C D
67. A B C D	77. A B C D	87. A B C D	97. A B C D
68. A B C D	78. A B C D	88. A B C D	98. A B C D
69. A B C D	79. A B C D	89. A B C D	99. A B C D
70. A B C D	80. A B C D	90. A B C D	100. A B C D

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**BASIC WELDING  
CEU TRAINING COURSE**

**CUSTOMER SERVICE RESPONSE CARD**

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**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

# **Basic Welding CEU Training Course Assignment**

**The Assignment (Exam) is also available in Word on the Internet for your convenience, please visit [www.ABCTLC.com](http://www.ABCTLC.com) and download the assignment and e-mail it back to TLC.**

You will have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to [info@tlch2o.com](mailto:info@tlch2o.com).

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself.

**You are expected to circle the correct answer on the enclosed answer key. Please include your name and address on your exam. The answer key is in the front. There are no intentional trick questions.**

You can e-mail or fax your Answer Key along with the Registration Form to TLC.

## **Welding Introduction**

1. Many diverse energy sources can be used for welding, including a gas flame, an electric arc, a laser, friction, electron beam, and ultrasonic.  
A. True B. False
  2. Welding is a hazardous responsibility and precautions are required to avoid burns, electric shock, vision damage, inhalation of poisonous gases and fumes, and exposure to \_\_\_\_\_.  
A. Welding fire(s) C. Hazardous activiti(es)  
B. Intense ultraviolet radiation D. None of the above
  3. Until the end of the 19th century, the only welding method was forge welding, which blacksmiths had used for centuries to join iron and steel by \_\_\_\_\_.  
A. Heating and hammering C. Inexpensive joining methods  
B. Welding, cutting, and brazing D. 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. Electric resistance welding C. Arc welding and oxyfuel welding  
B. Intense ultraviolet radiation D. None of the above
  5. Welding technology advanced quickly during the early 20th century as World War I and II drove the demand for reliable and inexpensive joining methods.  
A. True B. False

## **Background**

### **Cutting**

6. Gas and arc welding equipment can be used for \_\_\_\_\_.
- A. Cutting metals      C. Potential ignition source for a fire  
B. Joining              D. None of the above
7. Oxyacetylene gas cutting is similar to \_\_\_\_\_ welding, except that the blowpipe is fitted with a cutting attachment and work is done at a greater pressure.
- A. Arc                  C. Oxyacetylene  
B. Hammer              D. None of the above
8. Arc cutting is similar to \_\_\_\_\_ welding, except that special electrodes are used and the molten metal is either oxidized or blown away.
- A. Arc                  C. Oxyacetylene  
B. Hammer              D. None of the above
- Gas Welding**
9. Oxyacetylene 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 burning gas with a temperature of around \_\_\_\_\_ degrees C.
- A. 3,000                C. 5,000  
B. 1,200                D. 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. Rod of solder        C. Rod of filler metal  
B. Stinger               D. None of the above

### **Welding Safety Section**

11. Welding, cutting, and brazing are hazardous activities that pose a unique combination of dangerous gases to more than 500,000 workers in a wide variety of industries.
- A. True    B. False
12. The risk from fatal injuries alone is more than \_\_\_\_\_ workers over a working lifetime.
- A. 25 deaths per 1000      C. 4 deaths per 100  
B. 4 deaths per 1000        D. None of the above
13. \_\_\_\_\_ are addressed in specific standards for the general industry, shipyard employment, marine terminals, and construction industry.
- A. Extreme heat and flames      C. Welding, cutting, and brazing  
B. Particulate matter              D. 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. Extreme heat and flames      C. Welding, cutting, and brazing  
B. Particulate matter              D. None of the above

15. \_\_\_\_\_ 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. Goggles and welding helmets with dark UV-filtering face plates are worn to prevent this exposure.

- A. Various types of oxides
- C. The brightness of the weld area
- B. Manganese welding fumes
- D. None of the above

16. Welders are often exposed to dangerous gases and \_\_\_\_\_.

- A. Extreme heat and flames
- C. Welding, cutting, and brazing
- B. Particulate matter
- D. None of the above

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

- A. Various types of oxides
- C. The brightness of the weld area
- B. Manganese welding fumes
- D. None of the above

18. Exposure to \_\_\_\_\_, for example, even at low levels ( $<0.2 \text{ mg/m}^3$ ), may lead to neurological problems or to damage to the lungs, liver, kidneys, or central nervous system.

- A. Various types of oxides
- C. Nano particles
- B. Manganese welding fumes
- D. None of the above

19. \_\_\_\_\_ can become trapped in the alveolar macrophages of the lungs and induce pulmonary fibrosis.

- A. Nano particles
- C. Dangerous gases and particulate matter
- B. Manganese welding fumes
- D. None of the above

20. The use of \_\_\_\_\_ 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
- C. Extreme heat and flames
- B. Compressed gases and flames
- D. 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
- C. Pursuing safe practices
- B. Adequate firefighting equipment
- D. None of the above

22. Ensure the working environment is fire-safe, especially the removal of flammable materials, arrange \_\_\_\_\_.

- A. Firewatchers
- C. Extinguishers and blankets
- B. Adequate firefighting equipment
- D. None of the above

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

- A. True
- B. False

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

- A. True
- B. False

25. Workers and supervisors- should be properly trained in the correct use of firefighting equipment such as extinguishers and \_\_\_\_\_.

- A. Periodic fire drills
- C. Adequate firefighting equipment
- B. Blankets
- D. None of the above

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

- A. Metal is hot
- C. Equipment should be shut down
- B. Lights need to turn off
- D. None of the above

### **Oxyacetylene Gas Welding**

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

- A. True
- B. False

### **Backfire**

28. A \_\_\_\_\_ is when the flame flashes back up the nozzle and is arrested at the mixer or injector in the blowpipe body.

- A. Blowback
- C. Backfire
- B. Flash
- D. None of the above

29. Flashfire may be caused by using a dirty tip, an overheated tip, or working at insufficient pressure.

- A. True
- B. False

### **Flashback**

30. A \_\_\_\_\_ is when the flame burns back into the tip, torch, hose, or regulator. It means that there is something radically wrong with the equipment that should be corrected before being used again.

- A. Backfire(s)
- C. Flashback
- B. Plume fire
- D. None of the above

31. If a Flashback occurs, the oxygen torch valve should be turned off quickly and then the fuel gas torch valve. Next, the oxygen cylinder and fuel gas cylinder regulators should be closed.

- A. True
- B. False

32. Acetylene gas itself, although bottled at relatively \_\_\_\_\_, is highly explosive. If it leaks into a confined space, nothing will happen until there is a spark or flame to ignite it.

- A. Low pressure
- C. Explosive pressure
- B. High pressure
- D. None of the above

### **Arc welding Electrical Safety**

33. 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
- C. Spray
- B. Voltage settings
- D. 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 'Sparks' and thus pose a dangerous fire hazard.

- A. True    B. False

## **Reducing exposure to welding fume**

35. Welders should understand the \_\_\_\_\_ they are working with.

- A. Dangerous sparks              C. Hazards of the materials  
B. Dangerous flashes              D. None of the above

36. OSHA's \_\_\_\_\_ standard requires employers to provide information and training for workers on hazardous materials in the workplace.

- A. Welding              C. Safety  
B. Hazard Communication      D. None of the above

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

- A. Natural drafts              C. Solvent residue and paint  
B. Fume and gases              D. 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. Natural drafts              C. Welding fume and gases  
B. Fume and gases              D. None of the above

39. 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              C. Ventilation and exhaust systems  
B. Plume source              D. None of the above

40. Local exhaust ventilation systems can be used to remove \_\_\_\_\_ from the welder's breathing zone.

- A. Plume source              C. Fume and gases  
B. Flashes              D. 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. Plume source              C. Toxic exposure  
B. Fume and gases              D. 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              C. Sparks  
B. Hazards of the materials      D. 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 torch handle itself.

- A. True    B. False

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                      C. Two valves on the torch handle  
B. Amount of oxygen and acetylene           D. 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. Amount of oxygen                              C. Two valves on the torch handle  
B. Amount of oxygen and acetylene           D. 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                              C. Amount of oxygen and acetylene  
B. Acetylene feather                           D. 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                              C. Amount of oxygen and acetylene  
B. Lower flame                                D. 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. Lower flame                              C. Amount of oxygen and acetylene  
B. Flame                                      D. None of the above

### **Cast Iron "Welding"**

49. Welding cast iron is actually a type of \_\_\_\_\_.

- A. Brazing                                    C. Soldering  
B. Welding                                  D. None of the above

### **MIG Welding Section**

50. MIG welding is an abbreviation for \_\_\_\_\_. It is a process developed in the 1940's, and is considered semi-automated.

- A. Metal Inert Gas Welding                    C. Metal Immobile Gas Welding  
B. Megalithic Inert Gas Welding              D. None of the above

### **MIG Welding Names**

51. When MIG 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                                    C. Oxygen  
B. Oxy-gas                                    D. 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 oxygen.

- A. True    B. False

### **MIG Voltage Type and Welding Polarity**

53. TIG and Arc welding machines use amperage to set the machine or a "constant amperage power supply".

- A. True    B. False

### **MIG Welding Gasses**

54. MIG welding would not be possible without \_\_\_\_\_.

- A. Wire stiffness              C. No shielding  
B. Shielding gas              D. None of the above

55. Shielding gas works as it is feed through the MIG gun and it literally suffocates the weld area from any air. This provides an \_\_\_\_\_ where the welding arc and filler wire can do their work to get the joint welded.

- A. Non-inert gas              C. Spray  
B. Air free zone              D. None of the above

### **MIG Welding Carbon Steel**

56. \_\_\_\_\_ welds are almost flawlessly done with a MIG welder.

- A. Carbon steel              C. Base metal  
B. Stainless steel              D. 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              C. Short circuit  
B. Welding arc              D. 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. Short circuit              C. Stick and Flux-Cored electrodes  
B. Shielding gas              D. 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. Carbon steel              C. Base metal  
B. Stainless steel              D. None of the above

60. MIG welding has a lot of difficulties welding dirtier metals. It also does not have to protect the weld when the Gas is gone.

- A. Slag                    C. Gas  
B. Coated metals        D. 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. Slag                    C. Gas  
B. Coated metals        D. 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    C. Stiffness of the rod  
B. Stiffness of the wire   D. 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. Slag                    C. Gas  
B. Coated metals        D. None of the above

### **Travel Angle**

64. Normal welding conditions in all positions call for a travel angle of 5 to 15 degrees. Travel angles beyond \_\_\_\_\_ degrees can lead to more spatter, less penetration and general arc instability.

- A. 20 to 25              C. 30 to 45  
B. 25 to 35              D. None of the above

### **Arc Welding Section**

65. Arc welding is the most widely used form of welding as it is slow and produces marginal welds.

- A. True    B. False

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

- A. New weld              C. High current/low voltage output  
B. Electric circuit       D. 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. Welding point        C. Rod of filler metal  
B. Slag                    D. 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. Gap                    C. New weld  
B. Electric circuit      D. None of the above

69. The temperature of the arc is about \_\_\_\_\_ degrees C which will melt most metals. As the arc is drawn along the joint, the tip of the electrode melts together with the Electrode.

- A. 7,500
- C. 8,500
- B. 5,500
- D. None of the above

70. \_\_\_\_\_ is coated with chemicals which partly turn into gas and partly melt in the arc.

- A. New weld
- C. Electric circuit
- B. The electrode
- D. None of the above

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

- A. Carbon
- C. Base metal
- B. Slag
- D. None of the above

72. \_\_\_\_\_ acts as a shield by keeping out the atmosphere.

- A. New weld
- C. The gas
- B. Slag
- D. 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 process
- C. Rod of filler metal
- B. Welding point
- D. 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. An electrode
- C. Shielding gas
- B. Electric circuit
- D. None of the above

### **Arc Power Supply**

75. To supply the electrical power necessary for arc welding processes, a variety of different Power supplies are often used.

- A. True
- B. False

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. Voltage
- C. Heat input
- B. Electric circuit
- D. 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.

- A. Voltage
- C. Heat input
- B. Electric circuit
- D. 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.

- A. Filler material
- C. Shielded metal arc welding
- B. Gas metal arc welding
- D. 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
- C. Heat input
- B. Electrode
- D. 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. Voltage
- C. Heat input
- B. Electrode
- D. 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. Voltage
- C. Greater heat concentration
- B. Electric circuit
- D. 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. Electrode
- C. Heat input
- B. Electric circuit
- D. 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
- C. Carbon dioxide (CO<sub>2</sub>) gas
- B. Fumes and/or slag
- D. None of the above

84. \_\_\_\_\_ itself acts as filler material, making a separate filler unnecessary.

- A. Filler material
- C. Base material
- B. The electrode core
- D. 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
- C. Shielded metal arc welding
- B. Greater heat concentration
- D. None of the above

86. \_\_\_\_\_ 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
- C. Arc welding
- B. Shielded metal arc welding
- D. 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
- C. Arc welding
- B. Shielded metal arc welding (SMAW)
- D. None of the above

88. \_\_\_\_\_ 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
- C. Submerged arc welding (SAW)
- B. Shielded metal arc welding (SMAW)
- D. None of the above

89. The \_\_\_\_\_ that 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
- C. Slag
- B. Atmospheric contamination
- D. 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
- C. Flux
- B. Consumable electrode
- D. None of the above

**Some of the best known welding methods include:**

91. \_\_\_\_\_ - 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
- C. Argon-based shielding gas
- B. Shielded metal arc welding (SMAW)
- D. None of the above

92. \_\_\_\_\_ protects the weld puddle from atmospheric contamination.

- A. Slag
- C. Flux
- B. Atmospheric contamination
- D. None of the above

93. \_\_\_\_\_ - 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)
- C. Shielded metal arc welding (SMAW)
- B. Gas tungsten arc welding (GTAW)
- D. None of the above

94. \_\_\_\_\_ - 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 ( $\text{CO}_2$ ) over the weld puddle to protect it from atmospheric contamination.

- A. Gas metal arc welding (GMAW)
- C. Flux-cored arc welding (FCAW)
- B. Shielded metal arc welding (SMAW)
- D. None of the above

95. \_\_\_\_\_ - 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)
- C. Flux-cored arc welding (FCAW)
- B. Shielded metal arc welding (SMAW)
- D. None of the above

96. \_\_\_\_\_ - 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 tungsten arc welding (GTAW)      C. Submerged arc welding (SAW)  
B. Shielded metal arc welding (SMAW)      D. 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      C. Resistance  
B. Weld deposition rate      D. 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      C. Electron beam welding  
B. Laser beam welding      D. 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.

- A. Forge welding      C. Explosion welding  
B. Ultrasonic welding      D. 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. Butt joint      C. Filler joint  
B. Base joint      D. None of the above

## **When Finished with Your Assignment...**

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