



# PRACTICE QUESTIONS FOR API RP 577

1. API 577\_\_\_\_\_ for the training and experience required to be an American Welding Society Certified Welding Inspector(CWI)
2. API 577\_\_\_\_\_ all welds to be inspected.
3. Who determines the welds to be inspected??
4. Who should be consulted on any critical , specialized or complex welding issues?
5. Three of the items listed below are welding inspection activities that can be separated into three stages corresponding to the welding work process.  
Which one does not belong??
6. Which of the basic arc welding processes is the most widely used?
7. How is shielding provided for the arc when using a consumable covered electrode in shielded metal
8. What are some disadvantages or limitations of shielded metal arc welding?
9. What does the DCEN stand for when used to describe the GTAW weld process?
- 10.What are some of the ☐ advantages to gas tungsten arc welding ?



## PRACTICE QUESTIONS FOR API RP 577

11. What is a welding process that produces fast a freezing weld pool and is generally suited for joining thin sections or root passes.
12. What type of weld process normally employs a semiautomatic mode and depends on a flux from a tubular electrode that contains a shielding gas from an externally supplied gas?
13. What type of welding is used extensively in shop pressure vessel fabrication and pipe manufacturing?
14. What type of welding process is predominantly limited to welding insulation and refractory support pins to tanks, pressure vessels and heater casings?
15. What is the definition of nondestructive examination?  
  
ANS: It is inspection methods, which allow materials to be examined without changing or destroying their usefulness.
16. What are the most commonly used NDE methods used during weld inspection ? NOTE: SELECT THE ANSWER THAT HAS ALL THE CORRECT METHODS!!!!
17. Where would you look for slag inclusion discontinuities?
18. Which NDE method is the most acceptable for a lap joint ?



## PRACTICE QUESTIONS FOR API RP 577

19. What is the most capable NDE method for finding a discontinuity such as incomplete fusion in a joint ?
20. When welding carbon steel, what is the major cause of lack of fusion in all welding processes?
21. When welding stainless steel what would cause porosity in the weld?
22. When welding stainless steel, what is the cause of undercut?
23. When welding carbon steel, how would you control burn through?
24. The Alternating Current Field Measurement (ACFM) technique is an electromagnetic non contacting technique that is able to detect and size surface breaking defects in a range of different materials and through coatings of varying thickness. This technique is ideal for inspecting:
25. What is the maximum temperature that ACFM may be used?
26. What are the 2 typical radioactive isotopes used for radiography?
27. What is the normal developing time for radiographic film at 68 F?
28. The transmitted film density through the radiographic image through the radiographic image through the body of the hole type IQI or adjacent to the wire IQI, in the area of interest, should be within the range of \_\_\_\_\_ for Gamma



## PRACTICE QUESTIONS FOR API RP 577

29. Radiographic \_\_\_\_\_ is the art of extracting the maximum information from a radiographic image.
30. How many cycles per second (now known as Hz or Hertz ) is classified as being in the ultrasonic frequency range?
31. What type of UT technique is used for thickness evaluation or to check for laminations, and/or other conditions ?
32. What does a C-scan display show?
33. The temperature of the calibration standard should be within \_\_\_\_\_ of the part to be examined .
34. What happens if during a system calibration check, it is determined that the UT equipment is not functioning properly?
35. Solid metals are \_\_\_\_\_ in nature and all have a structure in which the atoms of each crystal are arranged in a specific geometric pattern.
36. Metals in molten or liquid state solidify , Interlocking grains into a solid metallic structure called a :
37. The vast majority of metallic materials used for the fabrication of refinery and chemical plant equipment are used in the \_\_\_\_ form rather than cast



## PRACTICE QUESTIONS FOR API RP 577

38. Mechanical working of a cast ingot produces \_\_\_\_ materials by processes such as rolling, forging, or extrusion, which are normally at an elevated temperature
39. The addition of \_\_\_\_ to austenitic stainless leads to the formation of a very small iron and chromium carbide precipitates in the grains and at grain boundaries
40. Carbon steel is a two-phase alloy. One phase is a relatively pure form of iron called ferrite. With the addition of more than 0.06% percent of carbon, a second phase is formed called \_\_\_\_\_. This adds strength to steel
41. lamellar means :
42. The parts of a weld comprises three zones. What are these zones ?
43. The portion of the base metal has not been melted, but whose mechanical properties or microstructure have been altered by the heat of welding is called the:
44. What happens to the gas ,carbon dioxide, when it is exposed to weld arc temperatures ?
45. The primary purpose for preheating carbon and low-alloy steels is :
46. How far on each side of the weld should be preheat be maintained ?
47. The primary reason for post-weld heat treatment (PWHT) is to:



## PRACTICE QUESTIONS FOR API RP 577

48. What is the Brinnell hardness limit value for carbon steel in reining service ?
49. what are the two types of material test reports ?
50. typically ,steels with a carbon equivalent of less than \_\_\_\_ require no preheat
51. Steels with a carbon equivalent of higher than \_\_\_\_ require both preheat  
PWHT.
52. What are the two main concerns when welding on in service piping and  
equipment ?
53. hot tap and in service welding operations should be carried out only with  
low-hydrogen consumables and electrodes such as :
54. Carbon steels with a carbon equivalent (CE) greater than \_\_\_\_ should be  
welded with an extra low hydrogen electrode such as EXXXH4 .
55. liquid flow rates in piping to be hot tapped shall be between \_\_\_\_ feet per  
second and \_\_\_\_ feet per second
56. How much liquid should be above the area that is to be hot tapped on a  
storage tank or vessel?
57. What size electrodes should be used on the first weld pass on a hot tap or  
an in-service weld on piping or equipment less than 1/4 inch thick?
58. when using SMAW, what do the first two numbers of E7018 electrode  
identify ?



## PRACTICE QUESTIONS FOR API RP 577

ANS: 70000 psi ultimate strength

59. with a SMAW electrode AWS designation , the 4th character represents  
what?(EXXXX)

ANS: position

60. If a welder makes unacceptable production welds, the inspector must  
identify and quarantine all the improper weldments made by the welder .

The welder is then retested and fails his test. What is the next step ?

ANS: identify reason the welder failed and re train the welder



# PRACTICE QUESTIONS FOR API RP 577

## **WITH ANSWERS**

1. API 577\_\_\_\_\_ for the training and experience required to be an American Welding Society Certified Welding Inspector(CWI)

**ANS:** is not a replacement

2. API 577\_\_\_\_\_ all welds to be inspected.

**ANS:** does not require

3. Who determines the welds to be inspected??

**ANS:** Welding inspectors and/or engineers

4. Who should be consulted on any critical , specialized or complex welding issues?

**ANS:** A welding engineer

5. Three of the items listed below are welding inspection activities that can be separated into three stages corresponding to the welding work process.

Which one does not belong??

**ANS:** Tasks in selecting personnel

6. Which of the basic arc welding processes is the most widely used?

**ANS:** SMAW



## PRACTICE QUESTIONS FOR API RP 577

7. How is shielding provided for the arc when using a consumable covered electrode in shielded metal

**ANS:** Shielding is provided from the decomposition of the electrode covering

8. What are some disadvantages or limitations of shielded metal arc welding?

**ANS:** Deposition rates are low and slag must be removed at stops and starts.

9. What does the DCEN stand for when used to describe the GTAW weld process?

**ANS:** DCEN stands for direct current electrode-negative.

10. What are some of the advantages to gas tungsten arc welding?

**ANS:** It produces high purity welds and it allows for excellent control of root pass weld penetration.

11. What is a welding process that produces fast a freezing weld pool and is generally suited for joining thin sections or root passes.

**ANS:** GMAW-S

12. What type of weld process normally employs a semiautomatic mode and depends on a flux from a tubular electrode that contains a shielding gas from an externally supplied gas?



## PRACTICE QUESTIONS FOR API RP 577

**ANS:** FCAW

13. What type of welding is used extensively in shop pressure vessel fabrication and pipe manufacturing?

**ANS:** SAW

14. What type of welding process is predominantly limited to welding insulation and refractory support pins to tanks, pressure vessels and heater casings?

**ANS:** SW

15. What is the definition of nondestructive examination?

**ANS:** It is inspection methods, which allow materials to be examined without changing or destroying their usefulness.

16. What are the most commonly used NDE methods used during weld inspection ? NOTE: SELECT THE ANSWER THAT HAS ALL THE CORRECT METHODS!!!!

**ANS:** VT, MT, WFMT, PT, LT, ET, RT, UT, ACFM

17. Where would you look for slag inclusion discontinuities?

**ANS:** Weld metal zone and weld interface

18. Which NDE method is the most acceptable for a lap joint ?

**ANS:** PT



## PRACTICE QUESTIONS FOR API RP 577

19. What is the most capable NDE method for finding a discontinuity such as incomplete fusion in a joint ?

ANS: UT

20. When welding carbon steel, what is the major cause of lack of fusion in all welding processes?

ANS: improper heat input and improper welding technique.

21. When welding stainless steel what would cause porosity in the weld?

ANS: Improper shielding, not using a low hydrogen electrode, & welding in a high sulfur area.

22. When welding stainless steel, what is the cause of undercut?

ANS: fast travel speed.

23. When welding carbon steel, how would you control burn through?

ANS: use proper heat input

24. The Alternating Current Field Measurement (ACFM) technique is an electromagnetic non contacting technique that is able to detect and size surface breaking defects in a range of different materials and through coatings of varying thickness. This technique is ideal for inspecting:

**ANS:** Nozzles, ring-grooves and grind-out areas or radii

25. What is the maximum temperature that ACFM may be used?



## PRACTICE QUESTIONS FOR API RP 577

**ANS:** 900 F

26. What are the 2 typical radioactive isotopes used for radiography?

**ANS:** Iridium 192 or Cobalt 60

27. What is the normal developing time for radiographic film at 68 F?

**ANS:** 5 to 8 minutes

28. The transmitted film density through the radiographic image through the radiographic image through the body of the hole type IQI or adjacent to the wire IQI, in the area of interest, should be within the range of \_\_\_\_\_ for Gamma

**ANS:** 2.0 to 4.0

29. Radiographic \_\_\_\_\_ is the art of extracting the maximum information from a radiographic image.

**ANS:** interpretation

30. How many cycles per second (now known as Hz or Hertz ) is classified as being in the ultrasonic frequency range?

**ANS:** greater than 20000 HZ

31. What type of UT technique is used for thickness evaluation or to check for laminations, and/or other conditions ?

**ANS:** Straight beam



## PRACTICE QUESTIONS FOR API RP 577

32. What does a C-scan display show?

**ANS:** It shows a plan view of the test object

33. The temperature of the calibration standard should be within \_\_\_\_\_ of the part to be examined .

**ANS:** 25 F

34. What happens if during a system calibration check, it is determined that the UT equipment is not functioning properly?

**ANS:** All areas tested since the last calibration should be reexamined

35. Solid metals are \_\_\_\_\_ in nature and all have a structure in which the atoms of each crystal are arranged in a specific geometric pattern.

**ANS:** crystalline

36. Metals in molten or liquid state solidify , Interlocking grains into a solid metallic structure called a :

**ANS:** casting

37. The vast majority of metallic materials used for the fabrication of refinery and chemical plant equipment are used in the \_\_\_\_ form rather than cast

**ANS:** wrought



## PRACTICE QUESTIONS FOR API RP 577

38. Mechanical working of a cast ingot produces \_\_\_\_ materials by processes such as rolling, forging, or extrusion, which are normally at an elevated temperature

ANS: wrought

39. The addition of \_\_\_\_ to austenitic stainless leads to the formation of a very small iron and chromium carbide precipitates in the grains and at grain boundaries

ANS: carbon

40. Carbon steel is a two-phase alloy. One phase is a relatively pure form of iron called ferrite. With the addition of more than 0.06% percent of carbon, a second phase is formed called \_\_\_\_\_. This adds strength to steel

ANS: pearlite

41. lamellar means :

ANS: a plate-like

42. The parts of a weld comprises three zones. What are these zones ?

ANS: the weld metal ,the heat affected metal (zone), and the base metal

43. The portion of the base metal has not been melted, but whose mechanical properties or microstructure have been altered by the heat of welding is called the:



## PRACTICE QUESTIONS FOR API RP 577

ANS: heat affected zone

44. What happens to the gas, carbon dioxide, when it is exposed to weld arc temperatures ?

ANS: it breaks down into carbon and oxygen

45. The primary purpose for preheating carbon and low-alloy steels is :

ANS: to reduce the tendency for hydrogen induced delayed cracking

46. How far on each side of the weld should preheat be maintained ?

ANS: 2 inches

47. The primary reason for post-weld heat treatment (PWHT) is to:

ANS: relieve the residual stresses in a welded fabrication

48. What is the Brinnell hardness limit value for carbon steel in reining service ?

ANS: 200

49. What are the two types of material test reports ?

ANS: a heat analysis and a product analysis

50. Typically, steels with a carbon equivalent of less than \_\_\_\_ require no preheat

ANS: 0.35

51. Steels with a carbon equivalent of higher than \_\_\_\_ require both preheat PWHT.

ANS: 0.55



## PRACTICE QUESTIONS FOR API RP 577

52. What are the two main concerns when welding on in service piping and equipment ?

ANS: burn through and cracking

53. hot tap and in service welding operations should be carried out only with low-hydrogen consumables and electrodes such as :

ANS: E7018

54. carbon steels with a carbon equivalent (CE) greater than \_\_\_\_ should be welded with an extra low hydrogen electrode such as EXXXX-H4 .

ANS: 0.43%

55. liquid flow rates in piping to be hot tapped shall be between \_\_\_\_ feet per second and \_\_\_\_ feet per second

ANS: 1.3, 4.0

56. how much liquid should be above the area that is to be hot tapped on a storage tank or vessel?

ANS: 3 feet

57. What size electrodes should be used on the first weld pass on a hot tap or an in-service weld on piping or equipment less than 1/4 inch thick?

ANS: 3/32 inch or smaller



## PRACTICE QUESTIONS FOR API RP 577

58. when using SMAW, what do the first two numbers of E7018 electrode identify ?

ANS: 70000 psi ultimate strength

59. with a SMAW electrode AWS designation , the 4th character represents what?(EXXX)

ANS: position

60. If a welder makes unacceptable production welds, the inspector must identify and quarantine all the improper weldments made by the welder .

The welder is then retested and fails his test. What is the next step ?

ANS: identify reason the welder failed and re train the welder