

API 653 Certification Prep

API 575 Study Questions

*This following is a study aid that you can use to help you learn the details and content of **API RP-575, Inspection of Atmospheric and Low-Pressure Storage Tanks**. There will be about 15-30 questions from this document on the API 653 exam. We do not spend much time in class discussing this publication. So it is important that you become familiar with this content in your personal study sessions.*

The questions in this study aid are in the same order as API 575. An answer key will be provided in class. Its helpful to read through API 575 before working on this exercise!

Section 2

1. What old code was used to build rivet tanks? _____
2. What code covers the safety precautions of entering a tank? _____
3. What code covers cathodic protection of tanks? _____
4. What code covers tank linings? _____
5. What code covers tank venting? _____
6. What code covers design of low-pressure tanks? _____

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Section 3

1. When taking UT thickness readings, it is recommended to use a digital meter that also has a _____.
2. Dual-element transducers on a digital UT meter can effectively measure thickness between: _____ inch.
3. A dual-element transducer may give a false reading when the material thickness is less than _____ inch.
4. Which type of UT transducer is best for small diameter deep pits?
 - a. Single element transducers
 - b. Dual element transducers
 - c. Large diameter transducers
 - d. Transducers made with pure quartz
5. How does paint or a coating affect a UT thickness reading?
 - a. _____
 - b. _____
6. For coated tanks that have coatings that vary in thickness, which type of UT transducer is best?
 - a. Single element transducers
 - b. Dual element transducers
 - c. Large diameter transducers
 - d. Transducers made with pure quartz
7. When performing a UT scan, the scans should overlap by _____ of the transducer diameter.
8. When performing a UT scan, a large diameter transducer may miss _____ diameter deep pits.
9. UT shear-wave is primarily used in tanks to find defects in _____ joints.

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10. List four primary advantages of using the magnet-flux floor scanner.
- a. _____
 - b. _____
 - c. _____
 - d. _____
11. When using a magnet-flux scanner to inspect a tank floor, indications found are generally "proved-up" using _____.

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Section 4

1. When the product temperature in a tank increases, the vapor pressure of the product _____.
2. While in operation, which tank type roof is supported by internal members?
 - a. Cone roof
 - b. Dome roof
 - c. Floating roof
 - d. Umbrella
3. What is the primary reason(s) for using a floating roof? _____

4. Which type of external floating-roof is the most susceptible to sinking?

5. Which type of external floating-roof is the least susceptible to sinking?

6. The most common type of floating-roof seal is the _____
_____.
7. When are internal floating roof tanks used? _____

8. Low-pressure storage tanks are those with a design pressure from _____ psig to _____ psig.
9. Low-pressure storage tanks are normally used for products that have a high _____ pressure.
10. For pressures above _____ psig, the hemispheroidal, spheroidal, and noded spheroidal tanks are commonly used.

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Section 5

1. Tank pads with cinders that contain _____ compounds become corrosive when wet.
2. List 3 items in a sand pad that may cause bottom-side corrosion.
 - a. _____
 - b. _____
 - c. _____
3. List two causes of severe external corrosion at the bottom of the lower shell course.
 - a. _____
 - b. _____
4. Small depressions in the roof are susceptible to _____ corrosion.
5. Concentration cell corrosion may occur in the many niches of _____ tanks.
6. What metallurgy is primarily used when constructing crude oil tanks?

7. What are three common vapors that cause corrosion in a tank's vapor space?
 - a. _____
 - b. _____
 - c. _____
8. Generally in the liquid portion of a tank, internal corrosion is worse at the:
 - a. bottom of the tank.
 - b. top of the liquid.
 - c. welds.

Why? _____

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9. What type of tank failure results in a sudden loss of the product?

10. Cracks are most susceptible in _____ and between _____ holes.
11. What weld is most susceptible to cracking in a hot tank?

12. What weld is most susceptible to cracking in a large diameter tank?

13. What is the most likely problem when there is excessive uniform tank settlement?

14. What is a common problem with pressure-vacuum vents?

15. A plugged floating roof drain can cause the roof to _____.
16. The inspection checklists listed in Appendix C are:
- a. mandatory for all tanks.
 - b. mandatory only on low-pressure storage tanks.
 - c. considered a "memory jogger" for the inspector.

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Section 6

1. After a significant rainfall the _____ on floating roofs should be checked.

Section 7.1 - 7.3

1. Once the tank atmosphere is safe to enter and there is permit that allows entry, prior to entering the tank it is important to check the condition of _____ components to make sure that they won't _____.
2. Prior to conducting an external or internal inspection the inspector should review prior inspection _____.
3. What type of corrosion can happen between a bolt head and a steel plate?

4. When inspecting handrails pay particular attention to tubular members. Why?

5. Low spots on platforms that collect water are routine places for corrosion to occur. This can be solved by _____.
6. List the 4 types of tank foundations.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
7. For tanks on a concrete pad, the floor to pad joint should be _____.

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8. Corrosion below an anchor-bolt nut sometimes can be detected by _____ testing.
9. Pipe connected to tanks should be inspected. Where pipe enters soil, the soil should be dug away _____ inches to inspect for soil-to-air corrosion?
10. If distortion is found at the nozzles, the welds and shell area should be examined for _____.
11. Grounding connections should be _____ checked.
12. The resistance of the grounding connections should not exceed _____ ohms.
13. Which potential problem with coatings is most difficult to see? _____
14. Paint blisters occur most often on the _____ and on the shell area that receives the most _____.
15. The _____ side of an insulated tank is most susceptible to CUI.
16. CUI may be significant at the bottom of the tank. Why? _____

17. Inspectors should not walk on _____ tanks roofs.
18. The depth of a locally corroded area can best be measured with a long _____
_____.
19. The depths of isolated pits are normally measured with a _____.
20. What part of the shell of a floating roof tank usually corrodes at twice the rate of the rest of the shell? _____
21. Stiffeners and wind girders are normally inspected visually and by _____ testing.

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22. Caustic tanks may be subject to a corrosion mechanism called _____
_____.
23. Where is caustic cracking most common? _____
24. Caustic material seeping through cracks will usually form _____
deposits.
25. Prior to welding on a tank in caustic service the area should be thoroughly cleaned and
checked with an _____ solution.
26. Hydrogen blistering may be found on the shell near:
- a. bottom
 - b. nozzles
 - c. top of the tank
 - d. weld seams
27. Hydrogen blisters can be found using:
- a. _____
 - b. _____
 - c. _____
28. Tank shell distortions can be measured using a _____.
29. List 3 causes of tank shell distortion.
- a. _____
 - b. _____
 - c. _____
30. Tank shell distortions may cause welds to be highly _____ and result in
a _____.
31. Rivets can be best checked for looseness by using a _____.

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32. The thickness of a tank roof can be checked by _____ or _____.
33. When walking on a cone-roof tank, planks can be used. Planks that are used should be long enough to span _____.
34. Individuals on a tank roof should walk on the _____.
- Why? _____
35. When walking on a floating roof, the tank should always be in the _____ position.
36. Before allowing individuals on a floating roof tank that is not in the high-gauge position, a _____ test shall be performed before personnel are allowed on the roof.
37. External corrosion on a tank roof will usually be most severe at _____.
38. What is the primary reason for periodically inspecting flame arrestors?

39. When tunneling under a tank to inspect the bottom (it is rarely done!) it is difficult to properly _____ the tunnel.
40. Probably the most expensive way to inspect the bottom-side of the tank floor is to _____ the tank.
41. List the 3 types of floating roof drains
- a. _____
 - b. _____
 - c. _____

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42. When the tank is out-of-service, the floating roof drain piping can be checked by pressure testing. Drains with swing joints require testing at two pressures.
- a. 1st pressure: _____ psig, checks the _____
 - b. 2nd pressure: _____ psig, checks the _____
43. During the external inspection, float-type gauges should be checked to make sure they are not cracked or filled with _____.

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Section 7.4 - 7.7

1. Normally internal tank corrosion is most prevalent in:
 - a. _____
 - b. _____
 - c. _____

2. Dry pyrophoric material can cause:
 - a. cracking.
 - b. general metal loss.
 - c. ignition.
 - d. pitting,

3. Pyrophoric material may accumulate on the tank bottom or on the top of the _____.

4. In sour services, corrosion is often occurs in the _____.

5. In sour services, corrosive vapors are formed when the _____ mixes with moisture and air.

6. Carbon steel that has slag inclusions and _____ is more susceptible to hydrogen blistering.

7. Caustic stress corrosion cracking is prevalent in carbon steel when the temperature is above _____ °F.

8. Tank bottoms are normally inspected visually and with one of the following:
 - a. _____
 - b. _____
 - c. _____

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9. During the internal inspection, a tank floor can be 100% inspected or partially inspected when using a statistical method. Based on the statistical method answer the following:
- a. What percentage of the floor should be scanned? _____%
 - b. What pattern across the tank is generally used? _____
 - c. What part should be completely scanned? _____
10. Corrosion on the tank bottom may be very _____.
11. What simple technique can be used to pop deposits out of pits, making the pits much easier to see. _____
12. What tools can assist in measuring the depths of a localized corroded area?
- a. _____
 - b. _____
13. Rivet seams can be checked with a _____.
14. Depressions in the tank floor and in areas around roof supports should be checked for accelerated _____.
15. One method to check for penetrations in the bottom is to clean the tank floor and check for _____.
16. One method to check for bottom-side corrosion that is usually *not* effective is the _____.
17. Tanks with a welded bottom angle joining the bottom-to-shell should be checked for _____.

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18. Other methods to test the tank bottom include: (Describe and include any limits)
- a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
19. Tanks that contain dilute acids often are lined with _____.
20. An effective way to locate pinholes and cracks in lead is with _____.
21. Bulges in a lead liner indicate _____ behind the liner and are likely places of _____ of the liner.
22. What is a good practice when examining suspect areas in lead lined tanks?

23. Rubber tanks linings can be checked with a _____.
24. Holiday testing is used to test _____.
25. When using a holiday detector it is important that the voltage does not get high enough to _____ the lining.
26. Glass-lined tanks should never be _____.
27. What type of lined tanks should be painted a unique color to indicate they have a special lining? _____

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28. What is an effective inspection technique for checking whether there is corrosion behind a concrete lining? _____
29. When significant corrosion is seen on the roof during the internal inspection, it is important to erect scaffolding so that _____ can be taken.
30. If corrosion is found internally on the shell at a specific elevation in a cone roof tank, it is important to check the _____ at the same elevation.
31. What metallurgy should never be hammer-tested? _____
32. What internal tank component should be hydrostatically tested during an internal inspection? _____.
33. Steam heating coils should be inspected for _____ grooving in the _____ of the coil with either UT or RT.
34. Pontoons on swing line should be visually examined and checked using either _____ or _____.
35. When hydrotesting a tank consideration should be given to the _____ of the shell material.
36. If an atmospheric tank is air tested, the pressure should not exceed _____ inches of water.
37. A pneumatic test of a tank is good for finding _____ but is not a good _____ test.
38. What part(s) of the tank have a very low stress load? _____

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39. The pressure exerted on the sides of a tank is greatest at the _____ of the tank.
40. Which of following situations does *not* appreciably weaken the plate?
- a. Crack
 - b. Locally thinned area
 - c. Notch
 - d. Pit

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Section 8

1. How can leaking rivets and rivet seams be repaired?
 - a. _____
 - b. _____
 - c. _____
 - d. _____

2. When riveted seams are seal-welded, all rivets and seams within _____ inches from the weld should be _____.

3. Defective rivets can also be replaced with _____.

4. List specific requirements when performing weld repairs to rivet heads and seams.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____

5. When installing a new floor over an existing floor at least _____ inches of clean sand, or metal grating or concrete should separate the two floors.

6. When installing a new floor over an existing floor that is cathodically protected, the old floor should be _____.

7. When installing a new floor over an existing floor that is cathodically protected, and the old floor is not removed, _____ should be placed between the old and new floors.

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8. Prior to gouging out a crack, what should be done?

9. Deep pits may be filled with _____.
10. Prior to repairing a pit with a coating, the pit should be thoroughly _____.
11. Leaks in tank roofs are often repaired using a _____.

Section 9

1. Good inspection records are the basis of an _____ inspection program.
2. Tank records should be kept for the _____ of the tank.
3. List items that should be documented when internal or external tank inspections are performed.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
 - g. _____

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Other

1. What can happen when the pressure-vacuum vent plugs?

2. What is a "striker plate"?

3. Describe the purpose of the automatic bleeder vent on a floating roof.

4. Why are there special rules when performing weld repairs to leaks in riveted seams or at rivets?

5. List two disadvantages of foam log seals.