

01	☐ A	☐ B	☐ C	☐ D	☐ E
02	☐ A	☒ B	☐ C	☐ D	☐ E
03	☐ A	☒ B	☐ C	☐ D	☐ E
04	☐ A	☒ B	☐ C	☐ D	☐ E
05	☐ A	☐ B	☒ C	☐ D	☐ E
06	☐ A	☐ B	☐ C	☒ D	☐ E
07	☐ A	☐ B	☐ C	☒ D	☐ E
08	☒ A	☐ B	☐ C	☐ D	☐ E
09	☐ A	☐ B	☐ C	☐ D	☒ E
10	☐ A	☐ B	☒ C	☐ D	☐ E
11	☒ A	☐ B	☐ C	☐ D	☐ E
12	☐ A	☐ B	☐ C	☐ D	☒ E
13	☐ A	☐ B	☐ C	☒ D	☐ E

14	☐ A	☐ B	☐ C	☐ D	☒ E
15	☐ A	☒ B	☐ C	☐ D	☐ E
16	☐ A	☒ B	☐ C	☐ D	☐ E
17	☐ A	☐ B	☐ C	☒ D	☐ E
18	☐ A	☐ B	☒ C	☐ D	☐ E
19	☐ A	☐ B	☐ C	☐ D	☒ E
20	☐ A	☒ B	☐ C	☐ D	☐ E
21	☐ A	☐ B	☒ C	☐ D	☐ E
22	☐ A	☒ B	☐ C	☐ D	☐ E
23	☒ A	☐ B	☐ C	☐ D	☐ E
24	☐ A	☒ B	☐ C	☐ D	☐ E
25	☐ A	☐ B	☐ C	☒ D	☐ E
26	☐ A	☒ B	☐ C	☐ D	☐ E

27	☐ A	☐ B	☐ C	☐ D	☒ E
28	☐ A	☐ B	☒ C	☐ D	☐ E
29	☐ A	☒ B	☐ C	☐ D	☐ E
30	☒ A	☐ B	☐ C	☐ D	☐ E
31	☒ A	☐ B	☐ C	☐ D	☐ E
32	☐ A	☐ B	☒ C	☐ D	☐ E
33	☐ A	☒ B	☐ C	☐ D	☐ E
34	☐ A	☒ B	☐ C	☐ D	☐ E
35	☒ A	☐ B	☐ C	☐ D	☐ E
36	☒ A	☐ B	☐ C	☐ D	☐ E
37	☒ A	☐ B	☐ C	☐ D	☐ E
38	☐ A	☒ B	☐ C	☐ D	☐ E
39	☐ A	☐ B	☐ C	☐ D	☒ E

PRACTICE QUESTIONS

American Petroleum Institute: Individual Certification Programs (API)

510

510 - Pressure Vessel Inspector Certification

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for American Petroleum Institute: Individual Certification Programs (API) 510, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, 510
- the question number
- the email address on your order

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QUESTION 1

SINGLE CHOICE

According to ASME Section V, Article 2, what is the minimum number of radiographic images required for a spot examination of a circumferential butt weld joint?

- ☒ **A** One image, positioned at the location specified by the Owner/User
- ☐ **B** Two images, 180 degrees apart
- ☐ **C** Three images, equally spaced around the circumference
- ☐ **D** One image per 6 in (150 mm) of weld length

ANSWER A

WHY ASME Section V Article 2 (T-271) requires that for a spot examination, a single radiograph shall be taken at the location specified by the Owner/User. The '100%' or full radiographic examination requires a single image at each designated location for the full length, but spot examination by definition is a single location.

QUESTION 2

SINGLE CHOICE

A pressure vessel fabricator is welding SA-516-70 plates using SMAW with E7018 electrodes. Per ASME Section IX, which variable is classified as an essential variable for Procedure Qualification when changing from a 3/8 in (9.5 mm) plate to a 1/4 in (6.4 mm) plate of the same P-Number grouping?

- ☐ **A** Changing from E7018 to E7018 (same classification)
- ☐ **B** Changing from a 3/8 in plate to a 1/4 in plate thickness
- ☒ **C** Changing the welding position from 1G to 2G
- ☐ **D** Changing the welding current within the qualified range

ANSWER C

WHY Per ASME Section IX QW-255, changing the welding position (e.g., from 1G to 2G) requires requalification of the WPS as it is an essential variable. Plate thickness within the qualified range (per QW-202), within the limits of the qualified thickness, is not an essential variable change — a procedure qualified on 3/8 in plate qualifies a range of thicknesses including 1/4 in. The electrode classification is unchanged, so it is not a variable change at all.

QUESTION 3 SINGLE CHOICE

Under API 510, the maximum inspection interval for a pressure vessel operating in normal service shall not exceed:

- ☐ A 1 year
- ☐ B 3 years
- ☒ C 5 years, or half the remaining life, whichever is less
- ☐ D 10 years

ANSWER C

WHY Per API 510 Section 6 and Table 6-1, the maximum interval between internal inspections for vessels in normal service is 5 years (or, when a remaining-life calculation has been performed, half the calculated remaining life — whichever is less). External inspections are required at a maximum interval of 5 years (or half the remaining life), and on-stream inspections are typically performed at least annually.

QUESTION 4 SINGLE CHOICE

A pressure vessel inspector notes ring-shaped (circumferential) grooves on the external surface of a carbon steel shell operating at 220°F (104°C) in an environment containing combustion gases. This damage pattern is most consistent with:

- ☐ A Pitting corrosion
- ☐ B Stress corrosion cracking
- ☒ C External corrosion at supports / insulation contact surfaces (CUI)
- ☐ D Hydrogen blistering

ANSWER C

WHY Ring-shaped circumferential grooving on the external surface of a shell at operating temperatures in the corrosion-active range (typically 50°F–350°F / 10°C–175°C) and beneath insulation is the classic signature of Corrosion Under Insulation (CUI). Pitting produces discrete pits rather than circumferential grooves. SCC produces cracks, not grooves. Hydrogen blistering produces subsurface blisters, not surface grooving.

QUESTION 5

SINGLE CHOICE

Per ASME Section VIII Division 1, the minimum required thickness of a cylindrical shell under internal pressure, exclusive of corrosion allowance, is determined by:

- ☒ **A** UG-27 using the greater of the calculated value or the value from the minimum thickness table in the same paragraph
- ☐ **B** UG-25 (Pressure Relief) requirements
- ☐ **C** UCS-66 for low-alloy steels
- ☐ **D** UW-12 for welded joint efficiency

ANSWER A

WHY ASME Section VIII Division 1, UG-27 (Thickness of Shells Under Internal Pressure) provides the formula for required thickness of cylindrical and spherical shells. The result is compared to the minimum thickness specified in the same paragraph (typically 1/16 in / 1.6 mm for most materials), and the greater value is used as the minimum required thickness, excluding any additional corrosion allowance.

QUESTION 6

SINGLE CHOICE

A pressure vessel has a single relief device with a set pressure of 150 psig (10.3 barg). Per ASME Section VIII and API 510 requirements, the reseal (blowdown) pressure of a spring-loaded pressure relief valve is typically permitted to be:

- ☐ **A** Equal to the set pressure
- ☒ **B** Below the set pressure but at or above the normal operating pressure, within the limits specified in ASME Section VIII
- ☐ **C** Equal to the maximum allowable working pressure (MAWP)
- ☐ **D** At least 10% above the set pressure

ANSWER B

WHY ASME Section VIII requires that a spring-loaded pressure relief valve reseal (blow down) below the set pressure, but at or above the normal operating pressure of the vessel. Specific blowdown limits vary with set pressure (e.g., 5 psig minimum blowdown for low-pressure steam, with percentages or fixed values for higher pressures). API 510 inspectors verify that reseal pressures are within these limits during testing.

QUESTION 7

SINGLE CHOICE

An inspector is reviewing a vessel constructed of SA-387 Grade 11 Class 2 plate. This material is best described as:

- ☐ A A carbon steel plate for ambient temperature service
- ☐ B A high-alloy austenitic stainless steel for corrosive service
- ☒ C A chromium-molybdenum alloy steel plate typically used for elevated-temperature service
- ☐ D A nickel-copper alloy (Monel) for seawater service

ANSWER C

WHY SA-387 is the ASME specification for chromium-molybdenum alloy steel plates intended primarily for welded boilers and pressure vessels for elevated-temperature service. Grade 11 contains approximately 1.25% Cr and 0.5% Mo, and Class 2 has higher tensile and yield strength requirements. These materials are commonly used in refinery hydroprocessing reactors, fired heater tubes, and other elevated-temperature applications.

QUESTION 8

SINGLE CHOICE

Per ASME Section V Article 6 (Liquid Penetrant Examination) and Article 7 (Magnetic Particle Examination), which statement correctly distinguishes PT from MT?

- ☐ A PT can detect surface-breaking defects only; MT can detect both surface and subsurface defects
- ☒ B PT can be used on both ferromagnetic and non-ferromagnetic materials; MT is limited to ferromagnetic materials
- ☐ C MT requires a dark inspection area while PT can be performed in any lighting
- ☐ D Both PT and MT are volumetric examination methods

ANSWER B

WHY Both PT and MT are surface-examination methods, not volumetric. PT works on any non-porous material — ferromagnetic or non-ferromagnetic. MT (magnetic particle) requires the part to be ferromagnetic so that a magnetic flux can be established. Neither method reliably detects subsurface defects; deeper indications in MT are not typically credited beyond approximately 1/4 in (6 mm).

QUESTION 9

MULTIPLE CHOICE

Per API 510, which of the following items must be documented in the inspection records for a pressure vessel? (Choose two.)

- ☒ **A** Results of internal, external, and on-stream inspections including the inspection date and the inspector's signature
- ☐ **B** The vessel manufacturer's stock price at the time of fabrication
- ☒ **C** Calculations used for the determination of the maximum allowable working pressure (MAWP) when required, and any changes affecting the vessel's fitness for service
- ☐ **D** The personal hobbies of the Owner/User's representative

ANSWER A • C

WHY API 510 Section 11 (Inspection Records) requires thorough documentation, including inspection dates, inspection types (internal, external, on-stream), inspection findings, NDE performed, the inspector's signature and CGSB/API certification number, and any calculations supporting MAWP, remaining-life, or fitness-for-service determinations. Options B and D are not required inspection records and are clearly irrelevant to pressure vessel inspection.