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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)

580I

580 - Risk Based Inspection (Translated)

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) **580I**, 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, **580I**
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

QUESTION 1 SINGLE CHOICE

In Risk-Based Inspection (RBI) methodology as defined by API RP 580, risk is most accurately expressed as a function of which two variables?

- ☐ A Probability of failure and cost of failure
- ☒ B Probability of failure and consequence of failure
- ☐ C Inspection frequency and remaining wall thickness
- ☐ D Operating pressure and operating temperature

ANSWER B

WHY API RP 580 defines risk as the combination of the probability of failure (PoF) and the consequence of failure (CoF). This is the foundational definition that drives all RBI assessments. The other options either confuse risk with cost, mix in inspection parameters, or describe process conditions rather than risk.

QUESTION 2 SINGLE CHOICE

Which API 580 PoF category typically applies to equipment operating under well-controlled conditions, with damage mechanisms that are slow-acting and well understood, and that has a long history of similar service?

- ☒ A PoF Category 1 (Low)
- ☐ B PoF Category 2 (Medium)
- ☐ C PoF Category 3 (High)
- ☐ D PoF Category 4 (Very High)

ANSWER A

WHY API 580 describes PoF on a categorical scale. Category 1 (Low) corresponds to equipment with low susceptibility to damage, well-controlled operating conditions, and established service history. Higher categories (2, 3, 4) reflect increasing susceptibility, less control, or more aggressive damage mechanisms.

QUESTION 3

SINGLE CHOICE

When performing a qualitative Consequence of Failure (CoF) analysis in API 580, which of the following is NOT one of the standard consequence categories typically evaluated?

- ☐ A Safety and health impact on personnel
- ☐ B Environmental impact from a release
- ☐ C Direct economic loss due to production interruption
- ☒ D Manufacturer's warranty status of the equipment

ANSWER D

WHY API 580 consequence analysis typically evaluates four areas: safety, health, environmental, and economic (production loss / business interruption). Manufacturer's warranty status is an administrative/commercial matter and is not a CoF category in the RBI methodology.

QUESTION 4

SINGLE CHOICE

According to API RP 580, which of the following damage mechanisms is primarily driven by exposure to water-containing process streams at elevated temperatures, and is commonly found in heat exchangers and piping carrying wet sour service?

- ☐ A Hydrogen Embrittlement
- ☒ B Ammonium Bisulfide Corrosion
- ☐ C Thermal Fatigue
- ☐ D Graphitic Corrosion

ANSWER B

WHY Ammonium bisulfide corrosion occurs in refinery process equipment where H₂S and NH₃ are present along with water, typically in overhead systems and wet sour service. Hydrogen embrittlement is a separate mechanism related to atomic hydrogen uptake, thermal fatigue is mechanical/cyclic, and graphitic corrosion is cast-iron-specific.

QUESTION 5

SINGLE CHOICE

A key output of an API 580 RBI assessment is an inspection plan that is what?

- ☐ A A single fixed inspection interval applicable to all similar equipment
- ☐ B Based solely on regulatory requirements
- ☒ C Risk-based, allocating more frequent and more effective methods to higher-risk items
- ☐ D Identical for all equipment in the same process unit regardless of risk

ANSWER C

WHY The core purpose of RBI per API RP 580 is to plan inspections based on risk: higher-risk items receive more frequent, more reliable inspection methods (e.g., advanced NDE), while lower-risk items may have extended intervals or reduced methods. Inspection plans are not uniform, not purely regulatory, and not single fixed intervals.

QUESTION 6

SINGLE CHOICE

Which of the following data elements is generally required as an input for conducting an API 580 RBI assessment?

- ☐ A Marketing price projections for the products handled
- ☒ B Equipment design, fabrication, operating history, and process conditions
- ☐ C Stock price of the operating company
- ☐ D Employee training records unrelated to the equipment

ANSWER B

WHY API RP 580 requires substantive engineering data: design/fabrication details (material, thickness, code of construction), operating conditions (P, T, fluid composition), and service history (upgrades, prior failures, repairs). Financial/marketing/stock data and unrelated personnel records are not RBI inputs.

QUESTION 7

SINGLE CHOICE

In API 580 RBI methodology, inspection effectiveness is generally ranked. Which of the following typically represents the MOST effective inspection method for detecting sub-surface or through-wall flaws in pressure vessels and piping?

- ☐ A Visual external inspection only
- ☐ B Surface dye penetrant testing
- ☐ C Wet fluorescent magnetic particle examination of external surfaces
- ☒ D Radiographic testing or ultrasonic testing with qualified procedures

ANSWER D

WHY Volumetric methods such as radiographic testing (RT) and ultrasonic testing (UT) can detect sub-surface and through-wall flaws, whereas visual external and surface methods (PT, MT) cannot reliably detect sub-surface defects. API 580 acknowledges this hierarchy of effectiveness when allocating inspection methods to higher-risk items.

QUESTION 8

SINGLE CHOICE

According to API RP 580, which of the following is a primary risk mitigation option that reduces the probability of failure (PoF) of an in-service component?

- ☐ A Installing additional containment or diking
- ☒ B Implementing more effective inspection and monitoring
- ☐ C Relocating personnel away from the equipment
- ☐ D Purchasing additional insurance coverage

ANSWER B

WHY Inspection and monitoring detect damage before it reaches a critical size, thereby reducing the probability of failure. Containment/diking and personnel relocation reduce consequence of failure (CoF), not PoF. Insurance is a financial transfer mechanism and does not reduce PoF in API 580's methodology.

QUESTION 9

MULTIPLE CHOICE

Per API RP 580, which of the following are valid triggers for reassessing an RBI evaluation on a given piece of equipment? (Choose two.)

- ☒ **A** A significant change in process conditions such as operating temperature or pressure outside the original design envelope
- ☐ **B** A change in the plant's corporate logo or branding
- ☒ **C** Discovery of a new or different damage mechanism active in the equipment
- ☐ **D** A scheduled calendar reminder set every 10 years regardless of changes

ANSWER **A - C**

WHY API RP 580 requires reassessment when conditions that drive PoF or CoF change materially — such as operating conditions shifting beyond the original envelope, or when a different/additional damage mechanism is identified (e.g., due to a service change or new industry knowledge). Corporate branding changes and arbitrary fixed long-interval calendars are not valid reassessment triggers.