



API-SIEE Practice Questions

Shared by McIntosh on 14-10-2026

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Question 1

Question Type: MultipleChoice

What tool is designed to measure mechanical oscillations?

Options:

- A- Techometer
- B- Spectroscope
- C- Oscilloscope
- D- Vibration Meter



Answer:

D

Explanation:

The correct answer is D. Vibration Meter. A vibration meter is specifically intended to measure mechanical oscillations, usually in terms of displacement, velocity, or acceleration. In source inspection of large electrical equipment, especially electric motors over 500 HP, vibration measurement is important because excessive vibration can indicate problems such as rotor imbalance, shaft misalignment, bearing defects, looseness, soft foot, resonance, or installation errors. Since the API source inspection guide covers surveillance and verification activities for major rotating electrical equipment, understanding the purpose of vibration-measuring instruments is directly relevant to factory testing, condition verification, and acceptance evaluation.

The other options are not correct for this function. A tachometer measures rotational speed, not mechanical oscillation. A spectroscope is used for optical spectrum analysis and is unrelated to machinery vibration. An oscilloscope displays electrical waveforms and can show signals from sensors, but it is not the primary instrument designed specifically to measure machine vibration in routine inspection practice. Therefore, the best answer is Vibration Meter, because it directly measures the mechanical oscillatory behavior of equipment.

Question 2

Question Type: MultipleChoice

According to ANSI C57.12, each line terminal of a winding shall be tested to what maximum

value?

Options:

- A- Switching Impulse Insulation Level
- B- Chopped Wave Insulation Level
- C- Wye-Winding Insulation Level
- D- Basic Lightning Impulse Insulation Level

Answer:

D

Explanation:

The correct answer is D. In ANSI transformer standards under the C57.12 series, the impulse withstand capability assigned to transformer line terminals is expressed in terms of the Basic Lightning Impulse Insulation Level, commonly called BIL. This value represents the crest value of a standard lightning impulse wave that the transformer insulation system must be able to withstand without failure. It is used to establish the insulation coordination of the transformer and to verify that external terminals and associated winding insulation can tolerate expected surge conditions on the system.

From a source inspection perspective, this requirement is important because the inspector must verify that the transformer design data, nameplate information, and test documentation match the specified insulation class and impulse withstand ratings. The BIL rating is a fundamental acceptance characteristic for transformers because it confirms the equipment's ability to survive transient overvoltage events such as lightning surges. Switching impulse is a different category used more commonly on higher voltage equipment under certain system conditions. Chopped wave is a special test application, not the primary maximum insulation level designation asked here. Therefore, the correct maximum value is the Basic Lightning Impulse Insulation Level.

Question 3

Question Type: Multiple Choice

What is the purpose of labeling the temperature range on electrical equipment used in a Class I hazardous area?

Options:

- A- To verify the process temperature and the equipment temperature have the same Class I rating
- B- To ensure that the equipment maximum temperature does not exceed the autoignition temperature of the specific gas or vapor to be encountered
- C- To ensure the equipment is compatible with the other Class I devices
- D- To verify the maximum process temperature does not exceed high levels

Answer:

B

Explanation:

The correct answer is B. In a Class I hazardous location, flammable gases or vapors may be present. The purpose of the equipment temperature marking, often expressed through a temperature class or temperature code, is to ensure that under normal operation and specified abnormal conditions the equipment's maximum surface temperature will remain below the autoignition temperature of the hazardous atmosphere present. This prevents the electrical equipment itself from becoming an ignition source.

This is a fundamental hazardous-area protection concept used when inspecting electrical equipment nameplates, certifications, and compliance markings. The inspector must verify that the marked temperature classification is suitable for the gas group and ignition characteristics of the service environment. The marking is not intended simply to match process temperature, compare with other Class I devices, or confirm general high-temperature limits. Instead, it is specifically about ignition prevention in the presence of flammable vapors.

Within API-aligned source inspection practice, this falls under verification of equipment markings, nameplates, code compliance, and hazardous-area suitability during manufacturing review and inspection. Therefore, the temperature range or temperature classification label is used to ensure the equipment will **not exceed** the **autoignition** temperature of the gas or vapor present, making option B the verified answer.

Question 4

Question Type: MultipleChoice

Within the context of NEMA ICS 1, which of the following describes PD 3?

Options:

- A- Moisture occurs continuously, dust quantity becomes conductive when moist, and pollution is sufficient to cause tracking and erosion at a high rate
- B- Moisture occurs occasionally, dust quantity is sufficient to become conductive when moist and pollution is sufficient to cause tracking or erosion at a slow rate
- C- Moisture does not occur, always dry, dust insignificant and no effect from pollution
- D- Moisture occurs frequently, dust quantity is sufficient to become conductive when moist, and pollution is sufficient to cause tracking or erosion at a moderate rate

Answer:

D

Explanation:

The correct answer is D. In the insulation coordination context used by NEMA ICS 1, PD 3 refers to a pollution degree where conductive contamination or contamination that becomes conductive due to condensation is expected often enough to materially affect insulation performance. This means moisture occurs frequently, dust or other deposits can become conductive when moist, and the level of pollution is enough to produce tracking or erosion at a moderate rate. This classification is more severe than cleaner indoor environments, but not as extreme as the harshest pollution conditions.

From a source inspection standpoint, understanding the pollution degree is important when evaluating control panels, spacing, creepage requirements, insulating materials, and overall suitability of the equipment for the intended service environment. If the wrong pollution degree is assumed, the panel may have inadequate insulation distances and may be more vulnerable to flashover, tracking, surface deterioration, or premature failure in service.

Option C better reflects a very clean environment. Option B is more consistent with a less severe contamination condition. Option A describes a harsher situation than PD 3, with continuous moisture and more aggressive deterioration. Therefore, PD 3 is best described by D.

Question 5

Question Type: MultipleChoice

Areas where ignitable concentrations of flammable gases or vapors are present continuously or for long periods of time are classified as:

Options:

- A- Class I Zone 0.
- B- Class I Zone 1.

- C- Class I Division 2.
- D- Class I Zone 2.

Answer:

A

Explanation:

The correct answer is A, Class I Zone 0. In hazardous-area classification, Class I refers to locations where flammable gases or vapors may be present in the atmosphere. Under the Zone system, Zone 0 is the classification used where an ignitable concentration is present continuously, for long periods, or frequently enough that it must be assumed to exist during normal conditions. This is the most severe gas-vapor zone classification because the hazardous atmosphere is expected to be present as part of normal operation.

By contrast, Class I Zone 1 applies where flammable gas or vapor is likely to be present in normal operation, but not continuously for long periods. Class I Zone 2 applies where the hazardous atmosphere is not likely in normal operation and, if it does occur, it exists only for a short time. Class I Division 2 is also a less severe classification under the Division system, not the continuous-presence category.

From an API source inspection perspective, correct hazardous-area classification is critical because it governs the acceptable protection methods, enclosure types, markings, and certification requirements for electrical equipment installed in those areas.

Question 6

Question Type: MultipleChoice

According to API 541, when specified, shipping preparations shall make the equipment suitable for outdoor storage from the time of shipment for at least:

Options:

- A- three months.
- B- six months.
- C- nine months.
- D- twelve months.

Answer:

B

Explanation:

The correct answer is B. Under API 541, when outdoor storage protection is specified by the purchaser, the vendor's shipping preparation and preservation measures are intended to keep the motor and its accessories suitable for outdoor storage for at least six months from the time of shipment. This requirement is important because large motors are often delivered to project sites well before installation and may remain exposed to ambient weather conditions, humidity changes, dust, and condensation risks during storage.

In practical source inspection terms, this means the inspector should verify preservation measures such as protective covers, sealed openings, corrosion protection on exposed machined parts, moisture-control provisions, proper drain and breather arrangements where applicable, blocked or secured rotating elements if required, and adequate packing and marking for storage and transport. The goal is not only safe shipment, but also preservation of the motor's condition until installation and commissioning. Three months is generally too short for major project logistics, while nine and twelve months exceed the minimum duration stated in this requirement. Therefore, the API 541 minimum specified period for outdoor storage suitability after shipment is six months, making option B the verified answer.

Question 7

Question Type: MultipleChoice

According to NFPA 70, an insulated conductor used within a switchboard or switchgear shall be rated not less than the voltage applied to it and:

Options:

- A- water proof.
- B- flame retardant.
- C- totally enclosed.
- D- grounded.

Answer:

B

Explanation:

The correct answer is B because NFPA 70 requires conductors used inside switchboards and switchgear to be suitable not only for the circuit voltage, but also for safe operation within enclosed electrical assemblies where fault energy, heating, and fire propagation are important concerns. In this context, flame-retardant insulation is required so that internal wiring does not readily support combustion or allow fire to spread inside the equipment lineup. This is especially important during abnormal conditions such as arcing, overheating, insulation failure, or short-circuit events.

Within the API Guide for Source Inspection and Quality Surveillance of Electrical Equipment, switchgear is one of the major covered equipment categories for source inspection and quality surveillance activities. The guide emphasizes that source inspectors must verify compliance with governing specifications, referenced codes, approved drawings, and applicable industry standards during manufacturing and inspection. It also states that the guide focuses on source inspection and quality surveillance activities rather than detailed design engineering alone. Therefore, when inspecting switchgear internal wiring, confirming that conductor insulation is properly voltage-rated and flame retardant is the correct code-based requirement.

Question 8

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instruments is directly relevant to factory testing, condition verification, and acceptance evaluation.

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Question 9

Question Type: MultipleChoice

According to API RP 540, threaded conduit joints for explosionproof connections should be made with at least how many fully engaged threads?

Options:

- A- 2
- B- 3
- C- 4
- D- 5

Answer:

D

Explanation:

The correct answer is D. For explosionproof threaded conduit joints, API RP 540 requires a minimum of five fully engaged threads. This requirement is critical because explosionproof joints are intended to contain an internal explosion and prevent flame propagation into the surrounding hazardous atmosphere. The threaded path acts as a controlled flame path, cooling and quenching hot gases before they can exit the enclosure or conduit system at an ignition-capable temperature.

If too few threads are engaged, the flame path may be inadequate, reducing the joint's mechanical strength and compromising its ability to contain pressure and hot gases generated by an internal fault or ignition event. In hazardous locations, this becomes a major safety issue, especially for conduit-connected equipment such as junction boxes, motors, control panels, and other Class I installations. During source inspection and quality surveillance, the inspector should verify not only that the correct explosionproof fittings are used, but also that the conduit

joints are properly assembled with the required thread engagement and in accordance with the governing hazardous-area standard and approved drawings. Therefore, the minimum required number of fully engaged threads is five, making option D the verified answer.

Question 10

Question Type: MultipleChoice

What is an insulation resistance test?

Options:

- A- A test that determines the adequacy of electrical insulation for the normally occurring over voltage transient
- B- A test that determines the corrosive contaminants around the conductors, terminal spacing problems, and tolerance errors in cables
- C- A spot overvoltage test which uses an applied DC voltage to measure ohms
- D- A test that determines the voltage that electrical insulation can withstand during normal operation

Answer:

C

Explanation:

The correct answer is C. An insulation resistance test is performed by applying a DC test voltage to the insulation system and then measuring the resulting resistance value, typically in ohms or megohms. In practical terms, it is often described as a spot test because the instrument, usually a megohmmeter, applies a selected DC voltage and checks the insulation's resistance to leakage current at that point in time. This makes it a widely used diagnostic test for cables, motors, switchgear, control panels, and other electrical equipment.

Option A is more closely related to insulation adequacy against transient overvoltage conditions, which is not the main definition of an insulation resistance test. Option B describes issues that may influence insulation condition, but not the definition of the test itself. Option D is closer to a dielectric withstand or hi-pot concept, where the concern is the voltage insulation can tolerate, not the resistance value measured during the test. Therefore, the best and correct definition is a spot overvoltage test using applied DC voltage to measure insulation resistance, which makes option C correct.

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