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QUESTION NO: 1

Static Electricity accumulation could be a concern with which of the following fluids? (Select all that apply)

A. Sea water

B. Hexane

C. Benzene

D. Toluene

ANSWER: B C D

Explanation:

Hexane, Benzene, and Toluene are correct because they are flammable hydrocarbon liquids with very low electrical conductivity. During pumping, pipe flow, filtering, mixing, spraying, or tank filling, liquid contact and separation can generate electrostatic charge. In a low-conductivity liquid, that charge dissipates slowly, allowing a hazardous charge imbalance to accumulate on the liquid, equipment, or an isolated conductive object. If an electrostatic discharge occurs where the vapor concentration is within its flammable range, the discharge can provide an effective ignition source.

Process-safety practice therefore treats transfers and handling of these liquids as static-sensitive operations. Controls include electrically bonding and grounding conductive equipment, avoiding isolated metal components, controlling transfer velocity where applicable, using bottom/subsurface filling rather than splash filling, and allowing appropriate relaxation time before sampling or gauging. These measures reduce charge generation, promote dissipation, and minimize the chance that a spark occurs in a flammable atmosphere. The general principles for controlling static hazards during flammable-liquid handling are described by the Canadian Centre for Occupational Health and Safety and in API Standard 2003 guidance for protection against ignitions arising from static, lightning, and stray currents.

QUESTION NO: 2

Several operators have bypassed a low-flow trip during batch transfers because the trip frequently activates before the transfer line is fully primed. A review finds that bypass authorization is inconsistent and that the trip performance has not been evaluated.

Which corrective action would most effectively address the underlying process safety weakness?

A. Evaluate the trip and transfer design, correct the cause of spurious activation, and control any bypass through a formal process

B. Discipline each operator who bypassed the trip and retain the existing trip configuration

C. Permanently remove the trip because operators can monitor transfer flow locally

D. Require operators to record each bypass in the shift logbook

ANSWER: A

Explanation:

The most effective action is to evaluate and correct the trip and transfer design as needed, while establishing a controlled process for any necessary bypass. Repeated bypassing of a protective function is a weak signal that the safeguard may not be reliable, appropriately designed, or well understood. The corrective action must address both the technical cause of the nuisance activation and the management-system control of temporary impairments.

Disciplining operators without correcting the recurring condition can drive the behavior underground and leaves the impaired safeguard unresolved. Permanently removing the trip would require a hazard-based justification and is not supported by the facts. A logbook entry alone does not provide authorization, risk assessment, compensating measures, time limits, or restoration assurance.

QUESTION NO: 3

An operator reports that, during startup, a vessel level increased faster than expected and approached the high-level alarm before the transfer was stopped. No release occurred. The shift supervisor says that no investigation is needed because the alarm functioned and the event did not meet the site's recordable injury criteria.

What is the best response?

A. No review is needed because the high-level alarm prevented a release

B. The event should be screened as a near miss and investigated at a depth appropriate to its potential consequence

C. The operator should be disciplined because the level approached the alarm set point

D. The event should be recorded only if the vessel later overflows

ANSWER: B

Explanation:

The event should be screened and investigated to a depth commensurate with its actual and potential consequences. A rapidly rising vessel level that challenges a high-level alarm may reveal a control, procedure, training, equipment, or communication weakness that could lead to an overflow or loss of containment under slightly different circumstances. Effective incident investigation includes learning from near misses and safeguard demands, rather than limiting review to events that caused injury or damage. The functioning alarm is relevant evidence, but it does not demonstrate that the underlying deviation was adequately controlled.

QUESTION NO: 4

Which one of the following characteristics describes an organization that exhibits strong Process Safety Competency?

A. The organization identifies the skills required for effective process safety and establishes training to ensure that those skills are in place

B. The organization effectively manages hot work

C. The organization keeps operating procedures up to date

D. The organization rapidly follows through on employee suggestions

ANSWER: A

Explanation:

The organization identifies the skills required for effective process safety and establishes training to ensure that those skills are in place is the characteristic that directly demonstrates strong Process Safety Competency. In CCPS's Risk Based Process Safety framework, Process Safety Competency is a core culture element: an organization must deliberately define the technical, operational, and leadership competencies needed to manage process hazards, assess whether personnel possess them, and close gaps through structured training, qualification, mentoring, and continuing development. This approach makes competency an organizational capability rather than an assumption based solely on job title, years of service, or completion of generic training.

Effective competency management also supports reliable decisions throughout the process life cycle. Personnel need suitable knowledge and practical ability to recognize hazards, understand safeguards and operating limits, apply management-system requirements, and respond appropriately to abnormal situations. Training should therefore be tied to defined role requirements and verified as effective, with periodic refreshment when processes, technology, hazards, or responsibilities change. These practices create the knowledgeable workforce required to sustain process safety performance. CCPS identifies Process Safety Competency as one of the foundational elements of its RBPS approach; see CCPS Risk Based Process Safety resources and Guidelines for Risk Based Process Safety.

QUESTION NO: 5

A contractor performing vessel cleaning identifies an unexpected internal deposit that will require abrasive removal rather than the solvent cleaning described in the approved job plan. The revised method could generate combustible dust and requires different equipment inside the vessel.

What is the most appropriate action before the work continues?

A. Stop the work and reassess the changed scope through the applicable work-planning and permit controls

B. Allow the contractor to proceed because abrasive removal is a common industrial cleaning method

C. Continue under the existing permit if the contractor supplies its own respiratory protection

D. Defer evaluation until the vessel is returned to service because the deposit is inside the equipment

ANSWER: A

Explanation:

Work should be stopped and the changed scope should be reassessed through the applicable safe-work-planning, permit, and contractor-management processes before abrasive removal begins. The new method introduces hazards not addressed by the original plan, including dust generation, ignition sources, respiratory exposure, equipment suitability, confined-space conditions, and waste handling.

Continuing under the original permit would assume that controls developed for solvent cleaning are adequate for abrasive cleaning, which is not justified. A contractor may have technical expertise, but the host facility remains responsible for ensuring that changed work is evaluated, authorized, communicated, and monitored. Management of Change may also be needed if the revised activity alters the process or facility configuration, but the immediate requirement is to reassess and authorize the changed work scope.

QUESTION NO: 6

A contractor has been hired to apply a proprietary coating in an unoccupied process area. The coating has hazardous properties. What documentation should the contractor provide to the site owner before starting work? (Select all that apply)

A. The contractor’s procedure for handling and applying the coating

B. The site owner is responsible for protecting the site employees, so no contractor documentation needs to be provided

C. No documentation is required since the contractor’s technology is proprietary

D. A plan on how the contractor will protect all site employees from exposure

E. A Safety Data Sheet (SDS) for the coating materials

ANSWER: A D E

Explanation:

The contractor’s procedure for handling and applying the coating is required because the site owner needs sufficient information to coordinate the work safely with site operations, evaluate the application method, and ensure that appropriate work controls are in place before the job begins. A plan on how the contractor will protect all site employees from exposure is also necessary. Even when the immediate area is unoccupied, personnel may work nearby, enter the area, or be affected by vapors, spills, overspray, ventilation pathways, or emergency conditions. The protection plan should identify practical controls such as access restrictions, isolation, ventilation, personal protective equipment, monitoring where applicable, and emergency communication. A Safety Data Sheet (SDS) for the coating materials provides the essential hazard-communication information needed to understand chemical hazards, exposure controls, safe handling, storage, first aid, firefighting, spill response, and disposal considerations. OSHA’s Hazard Communication Standard requires safety data sheets for hazardous chemicals and requires hazard information to be available to exposed workers and employers. These documents enable the owner and contractor to fulfill their shared contractor-management and safe-work-planning

responsibilities while preserving legitimately proprietary chemical details. See OSHA Hazard Communication and 29 CFR 1910.1200.

QUESTION NO: 7

A line is provided for adding a chemical to a reactor to quench the reaction. The line has an automatic valve which is designed to open when reactor temperature exceeds the High-High limit. Which of the items are key parts of the ITPM (Inspection, Testing, and Preventive Maintenance) requirements for the valve? (Select all that apply)

A. Valve must be functionally tested to ensure that it opens quickly enough to quench the reaction

B. Valve must be designed to open quickly enough to quench the reaction

C. Valve and its control system must be inspected and tested with sufficient frequency to confirm that it will reliably open when required

D. Valve must be designed to fail open

ANSWER: A C

Explanation:

“Valve must be functionally tested to ensure that it opens quickly enough to quench the reaction” and “Valve and its control system must be inspected and tested with sufficient frequency to confirm that it will reliably open when required” are key ITPM requirements. The automatic quench valve is a safety-critical protective function: upon demand from the high-high reactor-temperature condition, the complete function must detect the condition, execute the logic, move the valve to its required position, and provide quench material soon enough to prevent escalation. Functional testing therefore needs to verify more than valve movement; it should confirm the required response time and, where practical, the end-to-end actuation path. Inspection and periodic testing are also necessary to identify degradation that could impair demand reliability, such as sticking, corrosion, loss of actuator power, instrument drift, wiring faults, or logic-solver failures. The test interval and scope should be established from the safety function’s performance requirements, applicable procedures, service conditions, and management-of-change controls. Effective ITPM records the test results, deficiencies, repairs, and return-to-service status so that the barrier’s continued availability can be demonstrated. This lifecycle focus is consistent with CCPS guidance on maintaining the integrity of process-safety equipment and OSHA’s requirement to inspect and test process equipment under written procedures and frequencies consistent with manufacturers’ recommendations and good engineering practices. See OSHA 29 CFR 1910.119 and CCPS Process Safety Beacon resources.

QUESTION NO: 8

When you comply with applicable regulatory standards you can be confident your plant is safe to operate. True or False?

A. True

B. False

ANSWER: B

Explanation:

False is correct because meeting applicable regulatory standards is essential but does not, by itself, demonstrate that a plant’s risks have been fully identified, understood, and controlled to an acceptable level. Regulations generally establish enforceable baseline requirements and may not address every credible scenario, equipment-specific degradation mechanism, operating mode, organizational interface, or site-specific hazard. Safe operation requires continuing, risk-based application of process-safety management throughout the facility life cycle.

CCPS guidance emphasizes managing process safety through integrated systems that identify hazards, evaluate and control risk, maintain asset integrity, manage operational and organizational changes, learn from events, and verify performance. Compliance activities can support those objectives, but safe operation also depends on the quality and effectiveness of implementation, operational discipline, competency, and continuous improvement. A facility therefore needs

to test whether safeguards remain effective in actual service and whether risk is being managed as conditions, knowledge, equipment, and operations change—not merely whether required rules have been met.

This distinction is consistent with CCPS's risk-based process-safety framework and OSHA's Process Safety Management standard, which requires a systematic program for managing hazards of highly hazardous chemicals. See CCPS Process Safety resources and OSHA 29 CFR 1910.119.

QUESTION NO: 9

The Management of Change element: (select all that apply)

A. Helps maintain safe process operations

B. Makes the evaluation of the safety impact of a small change optional

C. Helps avoid inaccuracies in process safety information

D. Requires communicating approved changes to affected contractors

ANSWER: A C D

Explanation:

Management of Change (MOC) is a core process-safety work process used to identify, review, authorize, communicate, and document changes before they are implemented. Accordingly, "Helps maintain safe process operations" is correct because a disciplined MOC process ensures that modifications to equipment, chemicals, technology, procedures, organization, or operating conditions receive an appropriate technical and risk review. This controls the possibility that a change will unintentionally create or increase process risk.

"Helps avoid inaccuracies in process safety information" is correct because information affected by an approved change must be kept current. Accurate process safety information is essential for such activities as operating procedures, training, process hazard analysis, mechanical-integrity decisions, and emergency planning. MOC records also provide traceability for the basis, scope, approvals, and safety implications of a modification.

"Requires communicating approved changes to affected contractors" is correct when contractors may be affected by the change. Communication and training must occur before startup or use as appropriate, so personnel understand changed hazards, safeguards, operating limits, and procedures. These practices align with CCPS risk-based process safety guidance and with the Management of Change requirements in OSHA's Process Safety Management standard. See CCPS Risk Based Process Safety and OSHA 29 CFR 1910.119.

QUESTION NO: 10 - (SIMULATION)

The XYZ Corporation decides to track an activity as shown in the diagram. They interpret the results to indicate a possible deteriorating performance in one of their process safety management elements.

ANSWER: See the explanation for the answer

Explanation:

Answer: Stakeholder Outreach

The declining number of industry-group meetings where XYZ personnel present significant lessons learned indicates deteriorating performance in the **Stakeholder Outreach** RBPS element.

Participation in external industry groups and sharing process-safety lessons learned are stakeholder-outreach activities. A downward trend suggests that the company is becoming less active in communicating, learning, and sharing with external stakeholders and the broader industry.

Although the graph is a metric, **Measurement and Metrics** is the means used to identify the trend—not the element represented by the activity being measured.