ASP Practice Test

1. There exists a gaseous mixture of 20% hydrogen and 80% propane. What is the Lower Flammability Limit (LFL) of the mixture in air if the flammable range of hydrogen is 4% - 75% and the flammable range of propane is 2.2% - 9.5%?

a. 2.42%
b. 2.56%
c. 3.56%
d.6.20%

2. Which of the following is NOT typically considered a direct monetary cost to a company, which may result from a workplace incident?

a. Worker's compensation payouts
b. Medical bill reimbursements
c. Long-term disability insurance payouts
d. Medication cost reimbursements

3. Which of the following is a TRUE statement regarding accident-prevention training in the workplace?

a. It is fundamentally more important for experienced employees to receive requalification training than for new employees to receive initial training.
b. Accidents are statistically prone to occur more frequently when workers have recently started a new job.
c. OSHA Standard 29 CFR 1910.38 requires that general safety-related training be conducted at regular annual intervals.
d. Accidents always increase directly after accident-prevention training

4. Which of the following is generally NOT true with regard to worksite safety inspections?

a. Inspectors are typically independent entities that do not have a direct affiliation with the organization or entity undergoing inspection.
b. Inspections are usually conducted by personnel who have robust knowledge, training, and/or experience within the subject area undergoing inspection.
c. Inspections can either be scheduled or unscheduled.
d. Inspections, by design, should always be detail oriented in nature.

5. A sound workplace security plan should have numerous measures in place to _____ visitors in the effort to ensure onsite personnel accountability and access protocol.

a. frisk and disarm
b. screen and restrict
c. interview and photograph
d. train and certify

6. A robust incident reporting system typically includes all of the following facets EXCEPT:

a. Mechanisms for properly reporting near misses
b. Clear direction on how to differentiate and properly distinguish among incident severity categories
c. Remote electronic access capabilities in the field
d. Notification processes for commencing incident investigations and filing insurance claims

7. Which of the following would be activated in response to a potential local emergency resulting from a tornado or flood?

a. a facility contingency charter
b. a facility disaster preparedness plan
c. a U.S. NOAA mitigation response beacon
d. a U.S. FEMA emergency condition notice

8. Which of the following is typically NOT a rationale for investigating a workplace accident/incident?

a. To determine the extent of damage or loss associated with the event
b. To assess or attain objective evidence for potential upcoming litigation
c. To reduce the potential for future similar recurrences
d. To assign culpability for rendering disciplinary action

9. Which of the following is a major benefit that can result from undergoing an EXTERNAL audit versus an internal audit?

a. Benchmarking of audit findings against that of industry competitors
b. Lower overall levels of cost and resource expenditures for the audit
c. More expeditious initiation of corrective action and lessons-learned protocol
d. Direct national certification opportunities are more readily available (e.g., ISO)

10. Which of the following tactics is NOT typically employed as an enforcement measure for ensuring compliance with safety program protocols?

a. Disciplinary action for blatantly disregarding safety rules
b. Incentives for proactively following safety rules
c. Training requirements
d. Mandatory participation in safety program activities and initiatives

11. Which of the following is typically NOT associated with the cold-hazard condition of digital frostbite?

a. Difficulty breathing
b. Absence of pain
c. Loss of damaged toes or fingers
d. Gray-colored skin

12. A sample of Californium-250 starts at a mass of 1 gram. If 637 milligrams remain after 8.5 years, what is the half-life of Cf-250?

a. 6.42 years
b. 12.65 years
c. 12.96 years
d. 13.06 years

13. Which of the following is NOT true with regard to hazardous wastes?

a. Some hazardous wastes can be recycled and reused.
b. Hazardous wastes are permitted to be stored in open pools or piles.
c. Hazardous wastes may regularly be combined with other waste types, as deemed applicable.
d. Hazardous wastes are regularly categorized as toxic, corrosive, and/or flammable.

14. A key preventive measure for avoiding or reducing the consequences of an explosion incident is to employ the use of _____.

a. material accountability custodians
b. an explosive material disposal (EMD) plan
c. explosive dust sniffers/detectors
d. barriers and distance

15. Which of the following is a likely POSITIVE impact that may ultimately arise from an accident/incident event?

a. A shift in workforce awareness
b. An overall decrease in workers' compensation premiums
c. A camaraderie-based shift in workforce morale
d. An increased trust in management

16. Which of the following is typically NOT utilized as a shielding material for protecting against exposure to gamma- or X-ray radiation?

a. Concrete
b. Titanium
c. Water
d. Lead

17. Which of the following is NOT a conventionally employed technology used in air-cleaning-device systems?

a. Electrostatic precipitation
b. Mechanical separation
c. Differential pressure diffusion
d. Wet-collection trapping

18. To reduce the likelihood of workplace violence, employers should provide workplace stress training, as well as optional _____ for those employees who are in need of such assistance.

a. drug-rehabilitation programs
b. counseling
c. employee-concerns programs
d. vacation time

19. The domain of safety engineering typically does NOT focus on which of the following:

a. Performing statistical trials
b. Determining appropriate mitigations associated with incorrect product handling
c. Assessing potential scenarios in which products may be misused
d. Removing design defects

20. Which of the following is NOT considered a useful tool for reducing/eliminating biohazard exposures in the workplace?

a. Robotics
b. Facility separation/barriers
c. Personal protective equipment
d. First-aid response

21. Which of the following is an appropriate measure to follow for safely managing flammable and combustible materials?

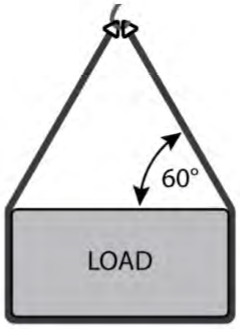
a. Plunger cans should be used for dispensing small quantities of material.
b. ANSI standards for storage cabinet design/configuration should be followed.
c. Pressurized vacuum pumps should be used for dispensing large quantities of material.
d. Static-electricity conductor mechanisms should be employed where flammable/combustible materials are stored or utilized.

22. Which of the following is NOT a typical means by which hazards arise during the conduct of maintenance activities?

a. Poorly written maintenance procedures are being used
b. Incorrect maintenance schedules are being followed
c. Manual power controls do not have a lockout/tagout capability
d. Systems are not designed for user-friendly maintenance

23. A sling has a Working Load Limit (WLL) of 1000 lbs when used in a vertical hitch. When the same sling is used in a 60-degree basket hitch with a sling angle factor of 0.866, what is the new WLL?

a. 866 lbs
b. 1732 lbs
c. 1155 lbs
d. 500 lbs



24. Which of the following is a widely employed method used in industry for reducing hazardous noise levels?

a. Using sound-reflective materials in building construction
b. Increasing vibrational frequencies
c. Wearing earmuffs over earplugs
d. Increasing airflow rates

25. Which of the following is NOT an acknowledged safety advantage associated with the use of head PPE, such as hard-hats, hoods, helmets, and soft caps?

a. Protection from blunt trauma injuries
b. Protection from hair catching on fire
c. Protection from hair being caught in machinery
d. Protection from extreme outdoor temperatures

26. A certain fire sprinkler is rated to protect 180 ft^2 of a light-hazard occupancy, 130 ft^2 of an ordinary-hazard occupancy, or 100 ft^2 of an extra-hazard occupancy. How many sprinklers are required to protect an occupancy with low combustibility and a moderate quantity of combustibles if it is 70 feet long by 38 feet wide?

a. 15
b. 19
c. 21
d. 27

27. In addition to maintaining a specific color-coding system, warning signs should also be _____ and _____ to the fullest extent practicable.

a. standardized / multilingual
b. certified / categorized
c. visible / luminescent
d. regulated / monitored

28. Which of the following is NOT a widely implemented control for reducing potential heat-stress-related injuries in the workplace?

a. Wearing reflective and insulated clothing
b. Regular hose spray-downs of work areas
c. Specialized training programs geared toward proper heat-management techniques
d. Physical examinations for determining employees of high cardiovascular risk

29. Per OSHA Standard 29 CFR 1910.25(b), fixed stairways shall be designed and constructed to carry a load of _____ times a normally anticipated live load, and never of less strength than to safely carry a moving concentrated load of _____ pounds.

a. 3 / 500
b. 5 / 1,000
c. 7.5 / 1,000
d. 10 / 500

30. A certain frictionless pipe is 6 inches in diameter on one end and 8 inches in diameter on the other end. If water enters the smaller end at a rate of 10 feet per second, what is the velocity of the water as it exits the larger end of the pipe? The density of water is approximately 62.43 lb/ft^3.

a. 0.82 ft/s
b. 5.63 ft/s
c. 7.50 ft/s
d. 13.33 ft/s

31. Efforts to systematically control structural hazards in the workplace typically do NOT entail which of the following facets?

a. Regularly assessing the environment in which the structure is used
b. Regularly communicating with personnel who are responsible for structure stewardship
c. A working knowledge of structural material behavior
d. Regularly employing on-the-spot design changes, as needed

Answer Key and Explanations

1. A: The LFL of a mixture is calculated according to the following formula:

$$\mathrm{LFL_{mix}} = \frac{1}{\frac{f_1}{\mathrm{LFL_1}} + \frac{f_2}{\mathrm{LFL_2}} + \ldots + \frac{f_n}{\mathrm{LFL_n}}}$$

where

LFL_m = lower flammability limit of the mixture

f_n = fractional concentration of component n

LFL_n = lower flammability limit of component n

$$\mathrm{LFL_{mix}} = \frac{1}{\frac{0.2}{0.04} + \frac{0.8}{0.022}} = 0.0242$$

2. C: Long-term disability insurance payments are NOT typically considered a direct monetary cost to an injured party's company resulting from a workplace incident. It is typically up to individual employees to independently purchase/maintain a long-term disability insurance plan on their own accord. Worker's compensation payouts, medical bill reimbursements, and prescription costs, can, however, have a direct influence on a subject company's expenditures and bottom line. Additional types of direct monetary costs can also include transportation costs and other logistical considerations for the injured worker while attaining care.

3. B: Accidents are statistically prone to occur more frequently when workers have recently started a new job; thus, it is most imperative that robust safety training regimens be rendered prior to such employees commencing work. Employees new to a job need to be effectively trained on how to perform their tasks in a correct fashion and what procedures need to be followed in the event of an incident. They also need to be made aware that safety is of highest priority within their company culture.

4. D: Worksite safety inspections are usually conducted by inspectors who are independent entities that do not have a direct affiliation with the organization or entity being inspected, and are likewise typically conducted by personnel who have robust knowledge, training, and/or experience within the subject area undergoing inspection. Moreover, inspections can be either scheduled or unscheduled, and can be either detail-oriented OR generalized in nature.

5. B: A sound workplace security plan should have numerous measures in place to screen and restrict visitors in the effort to ensure onsite personnel accountability and access protocol. In addition, such a plan should regularly oversee parking protocols and prevent unauthorized building access through windows, garages, rooftops, and ventilation shafts.

6. C: A robust incident reporting system typically includes reporting mechanisms for properly recording near misses; clear directions on how to differentiate and properly distinguish among incident severity categories; and notification processes for commencing incident investigations and filing insurance claims. Remote electronic access capabilities in the field, though a desirable option

if available, are not a mandatory element of such a system and are thus typically seldom implemented.

7. B: A facility disaster preparedness plan would be activated in response to a potential local emergency resulting from a tornado or flood, in likely tandem with a facility emergency response plan.

8. D: Potential rationales for investigating a workplace accident/incident typically include determining the extent of damage or loss associated with an event; to assess or attain objective evidence for potential upcoming litigation resulting from the event; to reduce the potential for future similar recurrences; and to identify the underlying cause(s) of the event itself. A root-cause analysis is hence often employed as a tool in support of such endeavors. Assigning blame should never be a fundamental goal of an accident investigation, as long as the incident entailed no malice or ill intent.

9. A: A major benefit that can result from undergoing an external audit is the collection and comparison of benchmarking information (per audit findings) against that of industry competitors that have undergone similar audits.

10. D: Mandatory participation in safety program activities and initiatives (e.g., VPP contests) is not typically employed as an enforcement measure for ensuring compliance with safety program protocols. Such measures may, however, include disciplinary actions for blatant disregard of safety rules; incentives for proactively following safety rules (e.g., gift cards provided to entire staff for having zero lost time over a calendar year); and safety training requirements.

11. A: Frostbite is a dangerous condition that can occur as a result of prolonged exposure to extreme cold. It manifests when the temperature of body tissues falls below the freezing point of those tissues (essentially below the freezing point of water). In such instances, tissue damage usually occurs, and can potentially lead to the loss of damaged toes or fingers in severe cases (digital frostbite). In addition, the victim may or may not feel pain associated with the onset of such a condition and likewise may also encounter skin that turns gray or white in color.

12. D: The half-life of a radioactive isotope can be calculated according to the following formula:

$$\text{Half-life} = \frac{\text{time} \times \log(2)}{\log(\frac{\text{initial mass}}{\text{final mass}})} = \frac{8.5 \text{ years} \times \log(2)}{\log(\frac{1\text{g}}{0.637\text{g}})} = 13.06 \text{ years}$$

13. C: There are numerous elements to be aware of in regard to the control and management of hazardous waste materials: many forms of hazardous waste can be recycled and ultimately reused; hazardous wastes are permitted to be stored in open pools or piles; hazardous wastes are typically categorized as toxic, corrosive, reactive, and/or flammable; and hazardous wastes should always be separately (independently) contained, treated, stored, and dispensed.

14. D: A key preventive measure for avoiding or reducing the consequences of an explosion incident is to employ the use of barriers and distance. Materials that can robustly blockade and contain explosive blasts (e.g., concrete bunkers) usually can absorb a large percentage of detonation energies as well as airborne projectiles resulting from such blasts. In addition, in most cases, the greater the distance from a subject explosion, the lesser the incurred human impact.

15. A: A likely POSITIVE impact that may ultimately arise from an accident/incident event is a shift in overall workforce awareness to the greater positive, in regard to levels of focus on safety

practices and future incident avoidance. On the negative side, workers' compensation premiums usually increase after the occurrence of incidents, trust in management goes down, and camaraderie/morale usually decline(s).

16. B: Titanium is usually not employed as an effective shielding material for protecting against exposure to gamma- or X-ray radiation. The best shielding materials against these types of ionizing radiations include lead, concrete, uranium, and water.

17. C: There are essentially four fundamental technology modes implemented in present industry that provide an air-cleaning functionality. These include electrostatic precipitation, whereby air contaminants become electrically charged as they pass through a subject system and ultimately adhere to collection plates that are oppositely charged; mechanical separation, whereby air contaminants are removed via high air-flow rates; wet collection, whereby air contaminants become trapped in system liquids and are ultimately cleaned; and filter systems (e.g., HEPAs), whereby contaminants are trapped by solid media with just enough porosity to allow cleansed air, but not contaminants, to pass through freely.

18. B: To reduce the likelihood of workplace violence, employers should provide workplace stress training, as well as optional counseling (individual, group) for those employees who are in need of such assistance. Of particular relevancy in this regard would be counseling geared toward anger-management or coping strategies.

19. A: The domain of safety engineering typically focuses on determining appropriate mitigations associated with incorrect product handling; assessing potential scenarios in which products may be misused; removing potential design defects; and performing product/process risk assessments. The rendering of statistical trials (data measuring and sample binning) is not typically inclusive of the work scope of most safety engineers.

20. D: Effective tools for reducing/eliminating biohazard exposures in the workplace include the use of robotics for remote handling of such hazards; physical separation of clean rooms and rooms that contain these hazards, along with robust permanent barriers between such rooms; the use of personal protective equipment; and a thorough training/qualification regimen. First-aid response would be an after-the-fact intervention in the majority of exposure cases and would thus likely not preclude most instances of potential infection.

21. A: The use of plunger cans is widely implemented for dispensing small quantities of flammable/combustible materials (such as solvents), particularly for industrial maintenance and cleaning activities. Such materials should never be highly pressurized, should always be grounded for safely dispensing of static charges, and should always be stored in NFPA-approved configurations.

22. C: Workplace hazards may arise in a number of different ways during the conduct of maintenance activities, including using poorly written maintenance procedures that do not clearly convey necessary step-by-step protocols; using incorrect or outdated maintenance schedules; and executing work functions on systems that are not of a user-friendly design for maintenance (e.g., limited access/service locations).

23. B: The adjusted WLL based on a vertical WLL can be calculated as

$$Adjusted\ WLL\ =\ Vertical\ WLL\ \times\ number\ of\ legs\ \times\ sling\ angle\ factor$$

Because a basket hitch goes under the load and is connected to the master link or hook at both ends, it has two legs. Therefore, the 60-degree basket hitch has a WLL of 1000×2×0.866 = 1732 lbs.

24. C: A widely employed method used in industry for significantly reducing hazardous noise levels is the use of double-barrier hearing PPE, whereby both earplugs AND earmuffs are worn by workers. Other helpful measures in this regard may include using sound-absorbent materials in building construction, decreasing vibrational frequencies, decreasing sound flow rates, and adjusting the directions of sound sources away from human receptors.

25. D: Safety features/benefits associated with the use of head PPE, such as hard-hats, hoods, helmets, and soft caps, include head/hair hygiene and sanitation; protection from hair catching on fire; protection from hair being caught in machinery; and blunt-trauma protection. Protection from hot weather is not associated with the aforementioned types of head PPE.

26. C: Under NFPA 13, occupancies with low combustibility and moderate quantity of combustibles are classified as ordinary hazard occupancies. Thus, the solution is the square footage of the building divided by the sprinkler rating for ordinary-hazard occupancies; $\frac{70\times38}{130} = 20.46$, and the number is rounded up to the nearest whole sprinkler, 21.

27. A: In addition to maintaining a specific color-coding system, warning signs should also be standardized and multilingual to the fullest extent practicable. The term standardized in this instance mainly pertains to consistency in sign shape and design.

28. B: Regular hose spray-downs of work areas are NOT a widely implemented control for reducing potential heat-stress-related injuries in the workplace. Although such a measure may temporarily decrease local ambient temperatures by a few degrees, it is not a viable long-term solution to excessive-heat work environments and can furthermore initiate additional concerns such as slipping hazards and a higher degree of relative humidity in the subject work area. Such measures as wearing reflective and insulated clothing, executing training programs geared toward proper heat-management techniques, and regular medical monitoring of employees at high cardiovascular risk are considered formidable controls for helping reduce/eliminate potential heat-stress incidents in the workplace.

29. B: Per OSHA Standard 29 CFR 1910.25(b), fixed stairways shall be designed and constructed to carry a load of five (5) times a normally anticipated live load, and never of less strength than to safely carry a moving concentrated load of one thousand (1,000) pounds. In addition, strict guidance is set forth within the regulations for limiting parameters associated with stairwell slopes, widths, and slip resistance.

30. B: Mass flow rate is defined as

$$M = \rho V A$$

Where ρ is density, V is velocity, and A is cross-sectional area. Since the openings of the pipe are circular, the equation for the area is

$$A = \pi r^2$$

Because mass flow rate is constant throughout a pipe, the mass flow rate at the small end of the pipe can be set equal to the mass flow rate at the large end of the pipe.