



QUESTION BANK

Name of the Department : Civil Engineering

Subject Code & Name : OME 754 / INDUSTRIAL SAFETY

Year / Semester : IV & VII

UNIT – I: INTRODUCTION

PART -A

1. Analyse about OSHA safety and health standard.

The Occupational Safety and Health Administration's (OSHA's) voluntary Safety and Health Program Management Guidelines, first published in 1989.1 They build on lessons learned about successful approaches and best practices under OSHA programs such as the Voluntary Protection Programs (VPP) and the Safety and Health Achievement Recognition Program (SHARP).

2. Define Incident rate.

Similar to the incidence proportion, the numerator of the incidence rate is the number of new cases identified during the period of observation. ... Thus, the incidence rate is the ratio of the number of cases to the total time the population is at risk of disease.

3. Formulate the Four most significant events in the history of the safety and health movement.

It is important for students of occupational health and safety to first study the past. Understanding the past can help safety and health professionals examine the present and future with a sense of perspective and continuity. Modern developments in health and safety are neither isolated nor independent. Rather, they are part of the long continuum of developments in the safety and health movement.



4. Identify the three E's of safety.

Safer City integrates and leverages a 3'E' approach, Engineering, Enforcement and Education into one framework to maximize key resources. This is done by working together with key stakeholders to: Reduce crashes.

5. List the objectives of integration proposed by H. G. Dyktor.

cooperative or integrated approach was H.G Dyktor. He proposed the following objectives of integration: 1) Learn more through sharing knowledge about health problems in the work place, particularly those caused by toxic substances. 2) Provide a greater level of expertise in evaluating health and safety problems.

6. Outline the various classification of Fire.

Class A - fires involving solid materials such as wood, paper or textiles. Class B - fires involving flammable liquids such as petrol, diesel or oils. Class C - fires involving gases. Class D - fires involving metals.

7. Identify the elements that are required to start and sustain fire.

Oxygen, heat, and fuel are frequently referred to as the "fire triangle." Add in the fourth element, the chemical reaction, and you actually have a fire "tetrahedron." The important thing to remember is: take any of these four things away, and you will not have a fire or the fire will be extinguished.

8. Sketch and explain flaming mode and smoldering mode of fire.

Smoldering is the slow, flameless form of combustion, ... The fundamental difference between smoldering and flaming combustion is that smoldering occurs on the surface of Fire statistics draw attention to the magnitude of smoldering combustion as the leading cause of fire deaths

9. Define flash point.

Flash point, the lowest temperature at which a liquid (usually a petroleum product) will form a vapour in the air near its surface that will "flash," or briefly ignite, on exposure to an open flame. The flash point is a general indication of the flammability or combustibility of a liquid.



10. Examine some of the common source of mechanical hazards.

Fire, electrical shock, or equipment damage may result. Check external wiring of equipment before use. ... Use of electrical equipment near water creates the potential for a shock hazard if water gets into the electrical system. In addition, there is the potential for malfunction or failure of the equipment.

11. Organize the classification of pressure vessels.

The pressure vessels according to end construction are classified as open end and closed end. A simple cylinder with a piston is an example of closed end vessel. ... Pressure vessels can theoretically be almost any shape, but shapes made of sections of spheres, cylinders, and cones are usually employed.

12. Tell about Pressure and Pressure hazard.

It is dependent on temperature. There are many sources of pressure hazards, which result from air trapped or expanded in body cavities from air trapped or expanded in body cavities. When sinus passages are blocked, expansion of the air in these sinuses can lead to problems.

13. Evaluate the potential safety hazard associated with boilers.

The most common boiler hazards that lead to accidents are low water levels, excessive pressure and a failure to purge combustible gases from the firebox before ignition. These hazards can cause serious boiler accidents like explosions or fire. ... Excessive pressure in a boiler can also lead to explosions.

14. Categorize the common mechanical hazards.

Mechanical hazards include:

Crushing.

Shearing.

Cutting or severing.

Entanglement.

Drawing-in or trapping.

Impact.

Stabbing or puncture.

Friction or abrasion.



PART -B

1. How may historically early attitudes towards tribes or nation have affected people's view of personal safety?
2. Develop in detail about the genesis and growth of safety and legislation.
3. Summarize the milestones in safety movement.
4. What is fire triangle? Explain its different components. Also summarize OSHA fire standards for fire prevention and suppression.
5. List down the steps of organizing for fire protection.
6. Evaluate the procedure to be followed when an emergency fire has started?
7. What do you know about reduction of fire hazards? Explain.
8. Summarize the mechanical hazards and the basic requirements of mechanical guards.
9. Examine in detail about the common Mechanical injury hazards.
10. Categorize OSHA's requirements for machine guarding and minimum general requirements for safeguards
11. What are the OSHA's recommendations for accident preventive measures associated with boilers? Also explain the hazards of unfired pressure vessels.
12. Identify the safety precautions for electrical hazards as per OSHA's standards
13. Formulate the methods for reduction of electrical hazards
14. Demonstrate the sources of electrical hazards and permanent electrical safety devices
15. Explain about Bhopal Tragedy and factory fire in Bangladesh – A case study
16. Categorize OSHA regulations for fire brigades
17. Propose some non-destructive testing for pressure vessels
18. Illustrate about electrical hazards to humans and the effect of current on human body for different dosage.



UNIT-II CHEMICAL HAZARDS

PART - A

1. What causes chemical burn injuries.

Acids and bases cause most chemical burns. Burns caused by chemicals can happen at school, work, or any place where you handle chemical materials. Some of the most common products that cause chemical burns are: car battery acid.

2. Recommend any two strategies to prevent chemical burn injuries.

Prevent chemical burns by wearing gloves and other protective clothing when you handle chemicals. Store chemicals, including gasoline, out of the reach of children. Use space heaters carefully. Keep them at least 3 feet away from curtains, rugs, bedding, clothing, and paper.

3. List down some chemicals that most frequently cause chemical burn injuries.

Some of the most common products that cause chemical burns are:

car battery acid.

bleach.

ammonia.

denture cleaners.

teeth whitening products.

pool chlorination products.

4. Organize the hazardous effects of chemical burns.

Signs and symptoms of chemical burns include the following:

Redness, irritation, or burning at the site of contact.

Pain or numbness at the site of contact.

Formation of blisters or black dead skin at the contact site.

Vision changes if the chemical gets into your eyes.

Cough or shortness of breath.



5. Identify the factors that are the reasons for toxic effects.

Factors Influencing Toxicity

Form and innate chemical activity.

Dosage , especially dose -time relationship.

Exposure route.

Species.

Life stage, such as infant, young adult, or elderly adult.

Gender.

Ability to be absorbed.

Metabolism.

6. Define Toxic Substance.

Toxicity is the degree to which a chemical substance or a particular mixture of substances can damage an organism. Toxicity can refer to the effect on a whole organism, such as an animal, bacterium, or plant, as well as the effect on a substructure of the organism, such as a cell (cytotoxicity) or an organ such as the liver (hepatotoxicity). By extension, the word may be metaphorically used to describe toxic effects on larger and more complex groups, such as the family unit or society at large. Sometimes the word is more or less synonymous with poisoning in everyday usage.

7. Classify airborne toxic substances based on its type of effects on human body.

Poisoning involves four elements: the poison, the poisoned organism, the injury to the cells, and the symptoms and signs or death. These four elements represent the cause, subject, effect, and consequence of poisoning. To initiate the poisoning, the organism is exposed to the toxic chemical. When a toxic level of the chemical is accumulated in the cells of the target tissue or organ, the resultant injury to the cells disrupts their normal structure or function. Symptoms and toxic signs then develop, and, if the toxicity is severe enough, death may result.

8. Recall about respirable silica exposure.

Scientists have long known that prolonged, excessive exposure to respirable-size particles of crystalline silica, created when workers chip, cut, drill or grind objects containing it, can increase health risks, such as the risk of developing silicosis or other ailments.



Criticize the factors that govern the severity of burns produced by a given chemical.

a. Source of the Burn.

A burn from nuclear radiation may appear to be minor, but is probably more serious than a thermal burn. Chemical burns are serious because chemicals which remain on the skin continue to burn the skin for hours or even days. Remaining in contact with the skin, chemicals can enter the bloodstream.

b. Degree of Burn.

If the burn penetrates the outer layer of the skin, as in second- and third-degree burns, the exposed tissues can be contaminated and invaded by harmful chemicals and microorganisms. Eventually, these chemicals and microorganisms can enter the circulatory system of the body.

c. Percentage of the Body Burned (Body Regions Burned).

The percentage of the body burned is an important factor in the probability for patient recovery.

d. Location of the Burn.

The areas of the body which were burned are important. A burn to the face may interfere with the airway or cause injury to the eyes. If the burn is on the groin, buttocks, or medial thighs, the potential for bacterial contamination is present.

e. Complications Accompanying the Burn.

A patient with other illnesses (such as respiratory problems, heart disease, or diabetes) is in greater jeopardy than a normal, healthy adult when burned. A minor burn for a healthy adult may be a serious burn for a person with any one of these health problems.

f. Age of the Patient.

Individuals in the 5 to 59 age range have the best chance for recovery from burns. Infants, children under 5, and adults over 60 have severe body reactions to burns. The healing pattern for burns is different in these age ranges of the population.



9. Inspect and list out the common routes of entry for toxic agents.

There are four major routes by which a chemical may enter the body:

- Inhalation (breathing)
- Skin (or eye) contact.
- Swallowing (ingestion or eating)
- Injection.

10. Define toxicology and toxic effects.

Toxicology is a scientific discipline, overlapping with biology, chemistry, pharmacology, and medicine, that involves the study of the adverse effects of chemical substances on living organisms[1] and the practice of diagnosing and treating exposures to toxins and toxicants.

PART - B

1. What are the OSHA standards for non-ionizing radiations?
2. Outline about External, Internal radiation hazard and controlling radioisotope hazards.
3. Organize the Form 3 presented by U.S. Nuclear regulatory commission to inform employees the standards for protection against radiation.
4. List down any four instruments for radiation detection and measurement.



UNIT-3: Environmental Control

PART - A

1. List out the forms of atmospheric contaminants.

There are four main categories of air contaminants which are of public health concern: Criteria Air Pollutants, Toxic Air Contaminants, Hazardous Air Pollutants, and Greenhouse Gases.

2. What is hazardous noise?

The NIOSH Recommended Exposure Limit (REL) for occupational noise exposure is 85 decibels, A-weighted, as an 8-hour time-weighted average (85 dBA as an 8-hr TWA) using a 3-dB exchange rate. Exposures at or above this level are considered hazardous.

3. Identify the frequencies of infrasound and ultrasound.

Ultrasound, which includes biologically significant sounds ranging from 15 kHz or so up to 200 kHz, is too high in frequency. Infrasound, effectively extending downwards from about 20 to 0.1 Hz or less, is too low in frequency.

4. Develop the factors by which motion be characterized.

Human factors and ergonomics is the application of psychological and physiological principles. By applying this approach, the Gilbreths reduced the number of motions.

5. Define threshold of hearing and threshold of pain.

Hearing becomes uncomfortable if the sound pressure level is above 110 decibels (threshold of discomfort), and it becomes painful above 130 decibels (threshold of pain).

6. Classify the conditions for health hazards in industry.

The Globally Harmonized System both classifies and categorizes hazard; the three hazard classes are health hazards, physical hazards, and environmental hazards. The four sub-classes of health hazards are corrosive, toxic, harmful, and irritant.



7. List out some strategies to prevent vibration related injuries.

The following precautions help to reduce whole-body vibration exposure:

Limit the time spent by workers on a vibrating surface.

Mechanically isolate the vibrating source or surface to reduce exposure.

Ensure that equipment is well maintained to avoid excessive vibration.

Install vibration damping seats.

8. Elaborate Impulsive noise.

Impulse noise is a category of (acoustic) noise that includes unwanted, almost instantaneous (thus impulse-like) sharp sounds (like clicks and pops)—typically caused by electromagnetic interference, scratches on disks, gunfire, explosions, and synchronization issues in digital audio.

9. Discover some approaches to prevent the inhalation of hazardously contaminated air.

Dusts are solid particles ranging in size from below 1 μm up to around 100 μm , which may be or become airborne, depending on their origin, physical characteristics and ambient conditions. This document does not deal specifically with other aerosols (such as fumes and mists), with very fine particles resulting from chemical reactions in the air, or with air pollution outside the workplace. However, in many cases similar principles of control apply to these as to dusts.

10. Recall about vibration.

Vibration, periodic back-and-forth motion of the particles of an elastic body or medium, commonly resulting when almost any physical system is displaced from its equilibrium condition and allowed to respond to the forces that tend to restore equilibrium.



11. Tell about Dosimeter.

A radiation dosimeter is a device that measures dose uptake of external ionizing radiation. It is worn by the person being monitored when used as a personal dosimeter, and is a record of the radiation dose received.

12. Illustrate the basic requirements generated by OSHA standards for hearing conservation program.

The Hearing Conservation Amendment to the OSHA Occupational noise exposure standard, 29 CFR 1910.95, requires that employers establish a hearing conservation program for employees whose noise exposures equal or exceed an 8-hour time-weighted average (TWA) of 85 dBA.

13. Compare whole body vibration and segmental vibration.

The most widely studied and most common type of segmental vibration exposure is hand-arm vibration exposure which affects the hands and arms. ... Whole body vibration energy enters the body through a seat or the floor, and it affects the entire body or a number of organs in the body.

14. Determine the critical noise risk factors.

When individuals are exposed to high levels of noise in the workplace, they can suffer from various adverse health effects. These health effects can be caused by a single exposure to a very loud noise or by exposure to raised levels of noise over a prolonged period of time.

The effects of noise on hearing depend on:

- Noise intensity or sound pressure
- Frequency or pitch of sound
- Exposure time
- Distance from source
- Individual susceptibility



15. Propose the steps to be followed to identify and assess hazardous noise in workplace.

Intensity/Loudness: This factor is measured by a noise level meter and the units are described in decibels (dB)

Frequency: Frequencies between 3000-4000 Hz are most likely to damage human hearing. ...

Duration: The length of time you have been exposed to noise.

The most common instruments used for measuring noise are the sound level meter (SLM), the integrating sound level meter (ISLM), and the noise dosimeter.

15. Classify some personal hearing protection devices.

Ear muffs consist of sound-attenuating material and soft ear cushions that fit around the ear and hard outer cups. They are held together by a head band.

16. Compare sound and noise.

Sound is what we hear. Noise is unwanted sound. The difference between sound and noise depends upon the listener and the circumstances. ... Sound is produced by vibrating objects and reaches the listener's ears as waves in the air or other media.

17. Classify the three broad types of industrial noise.

Industrial machinery and processes are composed of various noise sources such as rotors, stators, gears, fans, vibrating panels, turbulent fluid flow, impact processes, electrical machines, internal combustion engines etc. ... Most of these workers are in the production and manufacturing industries



PART - B

1. Tell about any four respiratory personal protection devices.
2. Examine some strategies to make employees comfortable with PPE.
3. Elaborate any four approaches to prevent the inhalation of hazardously contaminated air.
4. Evaluate the steps involved to identify and assess hazardous noise in workplace.
5. Develop in detail about the necessity of hearing protection device and its classifications.
6. Recall about vibration hazards and other effects of noise hazards.
7. Tell about the hazard levels of noise factors affecting the risk of hearing loss.
8. Organize the strategies to prevent vibration related injuries in detail.
9. Illustrate the forms of atmospheric contamination, chemical mixtures, detection and sampling..
10. Explain noise control strategies.
11. Explain engineering controls employed to reduce the noise at source.
12. Develop in detail about health hazard monitoring, personal hearing-protection devices standard generated by OSHA standards for hearing conservation program.
13. Explain the importance of eye protection and also describe some of the eye protection equipment.
14. Summarize the types of foot and leg protection equipment with a brief description.
15. Elaborate the components of evaluating hearing loss prevention program and explain any four components in detail.
16. Explain the characteristics of sound and list down the sound level of different sources.
17. Identify the types of finger, hand and arm protection equipment and describe any four briefly
18. Recall and explain about the standards and regulations related to noise hazards



UNIT-4: HAZARD ANALYSIS

PART - A

1. What is meant by system safety analysis?

System safety analysis (SSA) is a field within safety engineering that uses a proactive approach to risk management. SSA looks ahead to system failure and anticipated human behavior and interaction with system process equipment.

2. List the requirement of system safety analysis?

SSA looks ahead to system failure and anticipated human behavior and interaction with system process equipment. ... The goal of SSA is to ensure safe working environments by proactively identifying risks, then eliminating or controlling the risk through engineering or behavioral methods.

3. How may systems be used to reduce hazards?

The main ways to control a hazard include: Elimination (including substitution): remove the hazard from the workplace, or substitute (replace) hazardous materials or machines with less hazardous ones.

4. What is required for effective system safety analysis?

Systems-based approach to safety requires the application of scientific, technical and managerial skills to hazard identification, hazard analysis, and elimination, control, or management of hazards throughout the life-cycle of a system, program, project or an activity or a product.

5. Describe fault tree analysis.

Fault tree analysis is a top-down, deductive failure analysis in which an undesired state of a system is analyzed using Boolean logic to combine a series of lower-level events.



6. Give the advantages of fault tree analysis.

Fault tree visually depicts the analysis that will help a team to work on the cause of an event in a logical way that leads to failure.

7. Highlights the critical components related to system failure.

Provides an efficient method to analyze the system.

8. Discuss the Risk associated with Industrial work..

Slip and trip workplace falls. ...

Uncontrolled fires. ...

Heavy machinery. ...

Confined spaces. ...

Hazardous materials. ...

5 must-take steps to ensure safety in manufacturing facilities.

9. Name several of the prominent system analysis techniques.

Daniel Couger's definition on what system analysis techniques are: "System analysis consists of collecting, organizing, and evaluating facts about a system and the environment in which it operates."

10. What is the role of the Hazard Analysis?

A job hazard analysis (JHA), also called a job safety analysis (JSA), is a technique to identify the dangers of specific tasks in order to reduce the risk of injury to workers. Why is a JHA important? Once you know what the hazards are, you can reduce or eliminate them before anyone gets hurt.



11. Analyze the basic elements of a Hazard Analysis?

Hazard analysis is defined as the process of collecting and interpreting information on hazards and conditions leading to their presence to decide which are significant for food safety, and should be addressed in the HACCP plan.

12. What is the Relationship between Safety and Reliability?

Reliability requirements are concerned with making a system failure-free. Definition: Safety is the probability, that no catastrophic accidents will occur during system operation, over a specified period of time. Safety looks at the consequences and possible accidents.

13. What General Procedures Should Follow in the Performance of a Hazard Analysis?

The Health and Safety Executive's Five steps to risk assessment.

Step 1: Identify the hazards.

Step 2: Decide who might be harmed and how.

Step 3: Evaluate the risks and decide on precautions.

Step 4: Record your findings and implement them.

Step 5: Review your risk assessment and update if Necessary.

14. List the use of HAZOP from multiple perspectives.

HAZOP is used as part of a Quantitative Risk Assessment (QRA) or as a standalone analysis. HAZOP is a more detailed review technique than HAZID. The purpose of the HAZOP is to investigate how the system or plant deviate from the design intent and create risk for personnel and equipment and operability problems.



15. What is meant by HAZOP analysis?

A hazard and operability study (HAZOP) is a structured and systematic examination of a complex planned or existing process or operation in order to identify and evaluate problems that may represent risks to personnel or equipment. ... It is also used as the basis for reviewing batch processes and operating procedures.

16. Define the term Risk..

Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment loss, or harmful effects on the environment.

17. Propose the Safety Order of Precedence.

An order of precedence is a sequential hierarchy of nominal importance of items from Low Risk to High Risk. System safety precedence defines the order to be followed for satisfying system safety requirements and reducing risks.

18. Brief the term FMEA.

Failure Mode and Effects Analysis (FMEA) is a structured approach to discovering potential failures that may exist within the design of a product or process. Failure modes are the ways in which a process can fail. Effects are the ways that these failures can lead to waste, defects or harmful outcomes for the customer.

19. Compile the drawbacks of FTA.

- It reduces the tax revenues that are available to the government. ...
- Free trade can reduce the influence of native cultures. ...
- It can begin to degrade the value of domestic natural resources. ...
- Free trade can encourage poor working conditions. ...



PART - B

1. Explain the Functional Failures, Failure Modes, Failure effects and Failure Consequences of Reliability Centered maintenance.
2. What is fault tree analysis? Explain in detail.
3. State the types of hazards and explain any three in detail with possible causes and remedial actions.
4. Define failure with respect to machine and enlist the methods of failure analysis. Also explain FMEA method.
5. What is industrial safety? How it is associated with risk?
6. Give overview of HAZOP analysis and highlights its advantages, disadvantages.
7. Write a brief note on the methodology of HAZOP analysis in detail..
8. What Outputs Can Be Expected from a Hazard Analysis?.
9. Explain the following methods of analyzing Hazards.
(i) Qualitative Analysis (7) (ii) Quantitative Analysis (6)
10. How to Review and Specify a Safety Analysis?
11. On what basis is the methodology for Hazard analysis framed? Explainit.
12. Discuss on Evaluating a System Hazard Analysis.
13. Create an appropriate fault tree diagram to identify the critical fault for airplane crashes.
14. What is Common Cause Failure Analysis? Construct the methodology for CCA.
15. What are the system safety analysis techniques? Explain any two briefly?
16. Examine if the Safety analysis can be performed in timely manner?



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17. State any eight system safety analysis methods and techniques with its applicability and uses?
18. Explain the design process of proactive system safety program with flow chart.





UNIT-5: SAFETY REGULATIONS

PART - A

1. List major industrial accident in India.

- Bombay Docks Explosion (1944)
- Chasnala Mining Disaster (1975)
- The Union Carbide Gas Tragedy (1984)
- Korba Chimney Collapse (2009)
- Jaipur Oil Depot Fire (2009)
- Mayapuri Radiological Accident (2010)
- Visakhapatnam HPCL Refinery Blast (2013)

2. Develop the general factors of disaster.

- Poverty.
- Population growth. There is an obvious connection between the increase in losses from a disaster and the increase in population. ...
- Rapid urbanization. ...
- Transitions in cultural practices. ...
- Environmental degradation.

3. Draw the basic format of the disaster management cycle.

The Disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred.

4. What are the factors that are the bases for an explosion?

In general, an explosive has four basic characteristics: (1) It is a chemical compound or mixture ignited by heat, shock, impact, friction, or a combination of these conditions; (2) Upon ignition, it decomposes rapidly in a detonation; (3) There is a rapid release of heat and large quantities of high-pressure gases

5. Illustrate are the common sources of highly polluting waste from industry?

The common forms of industrial pollution from heavy industries or large-scale manufacturing include high loads of heavy metals (particularly lead, mercury, and cadmium), oil and grease,



biological oxygen demand (BOD), and suspended solid, which affect all components of the river and marine environments

6. 8. Define the term Disaster.

A disaster is a serious disruption occurring over a short or long period of time that causes widespread human, material, economic or environmental loss which exceeds the ability of the affected community or society to cope using its own resources.

7. Generalize some Special provisions given by Factories Act, 1948.

Health: For protecting the health of workers, the Act lays down that every factory shall be kept clean and all necessary precautions shall be taken in this regard. The factories should have proper drainage system, adequate lighting, ventilation, temperature etc. Adequate arrangements for drinking water should be made.

8. Classify the approaches to determine the safety training needs.

“Education deals with developing the mind, broadening knowledge and understanding. Education in a specific subject means acquisition of broad and thorough knowledge in that subject. Training deals with the development of skill in performance. In industry it refers to the skilled trades as applied to safety. Education and training are not completely separable; each participates to some extent of the nature of the other. Safety Education is for developing safety mindedness a vivid awareness of the importance and correcting conditions and practices that might lead to injury. Safety training is for developing the worker’s skill in the use of safe work techniques and practices. It is described as a detailed extension of the educational safety programmed applied to specific occupation, processes, jobs or activities”.

9. What are the forms of flammable material?

Flammable and Combustible Liquids

Flammable and combustible liquids vaporize and form flammable mixtures with air when in open containers, when leaks occur, or when heated. To control these potential hazards, several properties of these materials, such as volatility, flashpoint, flammable range and autoignition temperatures must be understood. Information on the properties of a specific liquid can be found in that liquid’s safety data sheet (SDS), or other reference material.



Flammable Aerosols

Flammable liquids in pressurized containers may rupture and aerosolize when exposed to heat, creating a highly flammable vapor cloud. As with flammable liquids, these should be stored in a flammable storage cabinet.

Flammable and Combustible Solids

Flammable solids often encountered in the laboratory include alkali metals, magnesium metal, metallic hydrides, some organometallic compounds, and sulfur. Many flammable solids react with water and cannot be extinguished with conventional dry chemical or carbon dioxide extinguishers. See Anecdotes for descriptions of incidents involving such materials.

Ensure Class D extinguishers, e.g., Met-L-X, are available where flammable solids are used or stored.

Sand can usually be used to smother a fire involving flammable solids. Keep a container of sand near the work area.

If a flammable, water-reactive solid is spilled onto skin, brush off as much as possible, then flush with copious amounts of water.

NEVER use a carbon dioxide fire extinguisher for fires involving lithium aluminum hydride (LAH). LAH reacts explosively with carbon dioxide.

Catalyst Ignition

Some hydrogenated catalysts, such as palladium, platinum oxide, and Raney nickel, when recovered from hydrogenation reactions, may become saturated with hydrogen and present a fire or explosion hazard.

Carefully filter the catalyst.

Do not allow the filter cake to become dry.

Place the funnel containing moist catalyst into a water bath immediately.



Purge gases, such as nitrogen or argon, may be used so that the catalyst can be filtered and handled in an inert atmosphere.

10. Define the term vulnerability.

Vulnerability is the inability to resist a hazard or to respond when a disaster has occurred. For instance, people who live on plains are more vulnerable to floods than people who live higher up.

11. Summarize about Artificial humidification as per The Factories Act, 1948.

In any factory in which the humidity of the air is artificially increased, the water used for the purpose shall be taken from a public supply, or other source of drinking water, or shall be effectively purified before it is so used.

12. Enlist the chapters in Factory act 1948.

Sections	Title
99	Penalty for permitting double employment of child
100	Omitted by the Factories (Amendment) Act,1987
101	Exemption of occupier or manager from liability in certain cases
102	Power of Court to make orders

13. Summarize the benefits of safety induction program.

Benefits of effective induction training to the organization

Saves a lot of money and time. ...

Reduces employee turnover. ...

Ensures operational efficiency. ...

Makes the new employee feel respected and valued. ...

Provides the necessary information. ...

Helps in establishing good communication.



14. Analyse the important legislation was enacted for affecting waste disposal?

Waste management laws govern the transport, treatment, storage, and disposal of all manner of ... of the US laws, some US states have enacted notable laws on other waste and environmental subjects. ... This is one of the most common and basic RCRA questions and is the key to the RCRA hazardous waste program.

15. Discover the aspects and goals of training methods

Training is a continuous and incessant learning process in human resource development. It helps to develop one's personality, sharpen the managerial and interpersonal skills, increase motivation, and improve the effectiveness of people employed in an organization.

16. Give the benefits of value measurement of safety training programme.

There are several methods that you can use to measure the effectiveness of your safety training program.

Survey your employees at the end of training. ...

Test the knowledge of your workers before and after the safety training. ...

Measure performance improvement through analysis of your accident records.

PART - B

1. Write salient features of Factory Act 1948(any four).
2. Outline the guidelines from factories act on annual leave with wages and working hours of adults.
3. Create a chronological order of training cycle as per OSHA and explain each step of the cycle.
4. Evaluate the cross cutting safety measures as per regulation 26 in explosion regulation 2014
5. Identify the points useful in designing and developing any training programme.
6. List down some of the industrial disasters happened in the past in food and mining industries.
7. List down the approaches to determine the safety training needs and the factors that decide the need for training courses.
8. Propose the types of safety training program and explain briefly.
9. Explain the safety measures and risk assessment for fire and explosion measures as per explosion regulation 2014.
10. Explain appropriate procedures for disposal of many liquid wastes.



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11. Explain the points to be considered for safety in industries as per The Factories Act, 1948.
12. Explain briefly about Product Liability insurance?
13. Tell about Hazards, Disaster, Vulnerability and its types in detail.
14. What is workman's compensation act and explain main features of the same? Also narrate the possible reasons for which compensation may not be given to employee.
15. Evaluate and list down some of the disasters occurred in energy industry.
16. Summarize the important guidelines of Factories Act, 1948.
17. Identify the major hazards occurred in Indian industries in the recent years
18. What are the essentials features of the federal consumer Product Safety Act?

