**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (AUTONOMOUS)**

**QUESTION BANK**

**Year / Semester: III B.Tech VI Semester** **Regulation: R23**

**Subject and Code: INDUSTRIAL SAFETY 23MEC365B**

# INDUSTRIAL SAFETY

**L T P C**

**3 0 0 3**

## PRE-REQUISITES:

**COURSE EDUCATIONAL OBJECTIVES:** The objectives of the course are to

1 Understand the concepts of industrial safety and management.

2 Demonstrate the accident preventions and protective equipment.

3 Understand and apply the knowledge of safety acts.

4 Knowledge about fire prevention and protection systems.

5.Understand and apply fire safety principles in buildings

## UNIT –1: Introduction to the development of Industrial Safety and Management

History and development of Industrial safety: Implementation of factories act, Safety and productivity, Safety organizations. Safety committees and structure, Role of management and role of Govt.in industrial safety.

## UNIT –2: ACCIDENT PREVENTIONS AND PROTECTIVE EQUIPMENT

Personal protective equipment, Survey the plant for locations, Part of body to be protected, Education and training in safety, Prevention causes and cost of accident, Housekeeping, First aid, Accident reporting, Investigations. Industrial psychology in accident prevention, Safety trials, Safety related to operations.

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## UNIT –3: SAFETY ACTS

Features of Factory Act, Introduction of Explosive Act, Boiler Act, ESI Act, Workman's compensation Act, Industrial hygiene, Occupational safety, Diseases prevention, Ergonomics, Occupational diseases, stress, fatigue, health, safety and the physical environment, Engineering methods of controlling chemical hazards, safety and the physical environment, Control of industrial noise and protection against it, Code and regulations for worker safety and health, codes for safety of systems.

## UNIT –4: FIRE PREVENTION AND PROTECTION

Features of Factory Act, Introduction of Explosive Act, Boiler Act, ESI Act, Workman's compensation Act, Industrial hygiene, Occupational safety, Diseases prevention, Ergonomics, Occupational diseases, stress, fatigue, health, safety and the physical environment, Engineering methods of controlling chemical hazards, safety and the physical environment, Control of industrial noise and protection against it, Code and regulations for worker safety and health, codes for safety of systems.

## UNIT –5: BUILDING FIRE SAFETY

Objectives of fire safe building design, Fire load, fire resistant material and fire testing – structural fire protection – structural integrity – concept of egress design -exit– width calculations – fire certificates – fire safety requirements for high rise buildings.

COURSE OUTCOMES:

| On successful completion of the course, students will be able to | | Pos |
|---|---|---|
| CO1 | Students learn the concepts of industrial safety and management. | *L2* |
| CO2 | Learn about the smart machines and smart sensors | L1,L2 |
| CO3 | Apply IoT to Industry 4.0 and they are able to make a system tailor-made as per requirement of the industry | L4,L5 |
| CO4 | Students learn about fire prevention and protection systems. | L2,L3 |
| CO5 | Students learn and apply the fire safety principles in buildings | L2,L4 |

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## TEXT BOOKS:

1. Occupational Safety Management and Engineering Willie Hammer–Prentice Hall(2000)
2. PurandareD.D& Abhay D.Purandare,—Hand book on Industrial Fire Safety‖ P&A publications, New Delhi, 2006.

## REFERENCE BOOKS:

1.Installation, Servicing and Maintenance Bhattacharya, S.N.- S.Chand and Co.

2.JainVK—FireSafetyinBuilding‖ NewAgeInternational1996.

3.Reliability, Maintenance and Safety Engineering by Dr.A.K.Guptha

4.A Textbook of Reliability and Maintenance Engineering by Alakesh Manna

5.McElroy, Frank E., —Accident Prevention Manual for Industrial Operations‖ , NSC, Chicago,1988.

6.Green, A.E.,—High Risk Safety Technology‖ , John Wiley and Sons,1984.

## REFERENCE WEBSITE:

- https://nptel.ac.in/courses/110105094https://youtube.com/playlist?list=PLbRMhD VUMngdXeb aRB59KdKwstzuAovua&si=FcbDQzZK6i_3TASD
- https://youtube.com/playlist?list=PLbRM hDVUMngdXeb aRB59KdKwstzuAovua&si=6RaMiYh Ekp5- EfAH
- https://youtube.com/playlist?list=PLln3BHg93SQ8RYKhe9czOHq1 hVjpEWMts&si= 5y0WMqX3wrv vispq

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**Max Marks: 10**

| S.No. | CO | Questions | BT |
|---|---|---|---|
| **Unit I: (**Introduction to the development of Industrial Safety and Management**)** | | | |
| 1 | **1** | Explain in detail about Safety committees and structure | L2 |
| 2 | **1** | Explain the history and development of Industrial Safety. Discuss the need and evolution of safety regulations in industries. | L4 |
| 3 | **1** | Describe the salient features and implementation of the Factories Act related to industrial safety. | L2 |
| 4 | **1** | Discuss the role and responsibilities of Management in ensuring industrial safety. | L2 |
| 5 | **1** | Describe the structure and functions of Safety Organizations in an industry | L2 |
| 6 | **1** | Explain the relationship between Safety and Productivity. How does effective safety management improve organizational performance? | L4 |
| 7 | **1** | Explain the constitution, structure and functions of Safety Committees in industries. | L2 |
| 8 | **1** | Explain the possible steps and measures to be taken by factory Management and Government with respect to industrial safety. | L2 |
| 9 | **1** | Discuss various safety policies and safety programs implemented in industries. | L4 |
| 10 | **1** | Discuss the importance of safety training programs and safety awareness campaigns in accident prevention. | L2 |



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|---|---|---|---|
| **Unit II: (**ACCIDENT PREVENTIONS AND PROTECTIVE EQUIPMENT**)** | | | |
| 1 | **2** | What is personal protective equipment? Explain different PPE used for different purposes the accidents in any industry. | L**2** |
| 2 | **2** | Describe emergency response systems, contents of first aid box, and responsibilities of first aid personnel. | L**2** |
| 3 | **2** | Discuss the procedure for accident reporting, investigation and analysis in industries. Why is it important for improving safety measures. | L**4** |
| 4 | **2** | Discuss the importance of Housekeeping in industries. | L**2** |
| 5 | **2** | Discuss in detail the importance of education and training in industrial safety. | L**2** |
| 6 | **2** | Describe the procedure for surveying a plant to identify hazardous locations. | L**3** |
| 7 | **2** | Explain the role of Industrial Psychology in accident prevention. | L**2** |
| 8 | **2** | Discuss Accidents in industries,causes and preventive measures for industrial accidents. | L**4** |
| 9 | **2** | Discuss safety measures related to industrial operations. | L**2** |
| 10 | **2** | Write detailed notes on Safety Trials and their importance in industrial operations. | L2 |

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|---|---|---|---|
| **Unit III:( SAFETY ACTS)** | | | |
| 1 | **3** | What are methods of controlling industrial noise and protection of employees against it. | **L2** |
| 2 | **3** | Explain in detail the salient features of the Factory Act. | **L2** |
| 3 | **3** | Describe the objectives, scope, and major provisions of the Explosives Act. | **L2** |
| 4 | **3** | Explain the Boiler Act in detail. | **L2** |
| 5 | **3** | Describe the Workmen's Compensation Act. | **L2** |
| 6 | **3** | Define Industrial Hygiene and explain its principles | **L3** |
| 7 | **3** | Explain Occupational Safety and Occupational Health in detail. | **L3** |
| 8 | **3** | Explain the principles of Ergonomics and their application in industry. | **L3** |
| 9 | **3** | Discuss stress and fatigue among industrial workers. | **L4** |
| 10 | **3** | Explain engineering methods of controlling chemical hazards. | **L2** |

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| S.No. | CO | Questions | BT |
|---|---|---|---|
| **Unit IV: (**FIRE PREVENTION AND PROTECTION**)** | | | |
| 1 | **4** | Explain the Fire Triangle and principles of fire extinguishing. | **L2** |
| 2 | **4** | Elaborate various fire extinguishing agents in detail. | **L2** |
| 3 | **4** | Describe different types of fire extinguishers. | **L2** |
| 4 | **4** | Explain fire stoppers, hydrant pipes, hoses, and fire monitors. | **L2** |
| 5 | **4** | Explain Active and Passive Fire Protection Systems. | **L4** |
| 6 | **4** | Classify fires into different classes (A, B, C, D, E). and<br>Explain characteristics of each class and suitable extinguishing agents. | **L3** |
| 7 | **4** | Describe the layout and design of standpipe systems in industries. | **L4** |
| 8 | **4** | Discuss fire rescue operations and emergency evacuation procedures. | **L2** |
| 9 | **4** | Explain the importance and procedure of conducting fire drills in industries. | **L2** |
| 10 | **4** | Classify burns and explain the first aid treatment for burns precautions, and medical referral. | **L3** |

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|---|---|---|---|
| **Unit V (**BUILDING FIRE SAFETY**)** | | | |
| 1 | **5** | Explain the objectives of fire safe building design. | **L2** |
| 2 | **5** | Define Fire Load and explain its significance in building design. | **L2** |
| 3 | **5** | Explain fire resistant materials and fire testing methods in detail | **L2** |
| 4 | **5** | Explain exit width calculations and occupant load determination. | **L3** |
| 5 | **5** | Describe structural fire protection in buildings. | **L2** |
| 6 | **5** | Explain the concept of egress design in fire safety engineering. | **L2** |
| 7 | **5** | Discuss fire safety requirements for high-rise buildings. | **L2** |
| 8 | **5** | Explain fire resistance rating and its importance in structural elements such as walls, floors, and columns. | **L2** |
| 9 | **5** | What is a Fire Certificate and Explain its purpose, issuing authority, documentation required, and compliance process. | **L2** |
| 10 | **5** | Discuss the behavior of steel and reinforced concrete structures under fire conditions. | **L4** |

Note: L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating



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## Instruction to Faculty Members:

## The Six Levels of Bloom's Taxonomy:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory (e.g., list, define, name, locate).
2. **Understanding:** Constructing meaning, explaining ideas, or concepts (e.g., summarize, interpret, classify, compare).
3. **Applying:** Using information in new situations or implementing procedures to solve problems (e.g., solve, use, demonstrate, implement).
4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure (e.g., contrast, categorize, distinguish, diagram).
5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing (e.g., judge, critique, justify, defend, argue).
6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure (e.g., design, construct, develop, formulate).