

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur– 603203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK



I SEMESTER

IS3162 –Principles of Safety Management

(M.E. INDUSTRIAL SAFETY ENGINEERING)

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Prepared by

Dr.R.SRINIVASAN

Assistant Professor-SG/ Mechanical Engineering



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IS3162 -Principles of Safety Management

UNIT I: CONCEPTS AND TECHNIQUES

History of Safety movement –Evolution of modern safety concept- general concepts of management – planning for safety for optimization of productivity -productivity, quality and safety-line and staff functions for safety-budgeting for safety-safety policy. Incident Recall Technique (IRT), disaster control, job safety analysis, safety survey, safety inspection, safety sampling, evaluation of performance of supervisors on safety.

PART - A (2 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1	Define Safety Engineering	BT1	Remember
2.	Write the relation between safety and productivity.	BT2	Understand
3.	Define the principles of Organizational Safety.	BT1	Remember
4.	Define safety concept.	BT1	Remember
5.	Define the role of management in safety.	BT2	Understand
6.	Define Productivity.	BT1	Remember
7.	Write four points about the need for safety.	BT4	Analyse
8.	List any four potential ways to get employee involvement in a safety training programme.	BT2	Understand
9.	Compare the terms hazard and risk.	BT1	Remember
10.	Write various steps in a major safety programme.	BT4	Analyse
11.	What is meant by safety publicity?	BT2	Understand
12.	List out any four modern safety concepts	BT1	Remember
13.	Why is the Incident Recall Technique (IRT) important?	BT4	Analyse
14.	Define job safety analysis.	BT2	Understand
15.	Define the term safety inspection.	BT2	Understand
16.	How is safety sampling judged as superior to other techniques?	BT2	Understand
17.	State the objectives of safety management.	BT2	Understand
18.	List the general safety training methods.	BT2	Understand
19.	What is a safety survey?	BT2	Understand

20.	What is disaster control?	BT2	Understand
21.	Define safety policy.	BT1	Remember
22.	What are the benefits of safety analysis?	BT1	Remember
23.	State the important rules of safety sampling.	BT1	Remember
24.	What are the advantages of a damage control system?	BT1	Remember
25.	What are the techniques of safety management?	BT1	Remember

PART – B (13 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	Explain the principles of management	BT2	Understand
2.	Describe about the general safety measures to be adopted.	BT1	Remember
3.	What are the various steps involved in man-made disaster control? Explain with a suitable case study.	BT2	Understand
4.	List the elements of a standard safety policy.	BT4	Analyse
5.	Summarize the events that led to the modern safety concept.	BT5	Evaluate
6.	Explain how as a safety engineer, you plan and prepare to counter any disaster in a hazardous chemical industry. Indicate the technique followed to counter the disaster.	BT3	Apply
7.	What is job safety analysis? Explain how job safety analysis is carried out with an example. Write the safety benefits of analysis.	BT1	Remember
8.	Indemnification by employer is ineffective. Justify	BT5	Evaluate
9.	Explain the history of safety management. Also explain the evolution of the modern safety concept.	BT3	Apply
10.	Explain the principles of management.	BT2	Understand
11.	Summarize the events that led to the modern safety concept	BT5	Evaluate
12.	Explain briefly how you would conduct a plant safety inspection. Prepare a checklist and inspection report format for inspecting a workshop for an engineering factory.	BT1	Remember
13.	Prepare a sample job safety analysis report for a hazardous job in a construction site.	BT4	Analyze
14.	Write in detail about the managerial responsibilities in safety issues.	BT4	Analyze
15.	Why Safety Committees are required in construction sites? Explain the advantages of Safety Committees.	BT5	Evaluate
16.	Explain in detail the safety procedures to be followed while operating wood	BT3	Apply

	working machinery.		
17.	Explain, with a checklist and report format, the procedure to conduct a plant safety inspection.	BT3	Apply
18.	Examine the responsibilities of the Safety Engineering department. Detail four key activities that play a vital role in preventing workplace accidents.	BT4	Analyze

UNIT II: SAFETY AUDIT - INTRODUCTION

Components of safety audit, types of audit, audit methodology, non-conformity reporting (NCR), audit checklist and report –review of inspection, remarks by government agencies, consultants, experts – perusal of accident and safety records, formats– implementation of audit indication - liaison with departments to ensure co-ordination – check list – identification of unsafe acts of workers and unsafe conditions in the shop floor.

PART - A (2 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	What do you understand by the scope of the audit?	BT2	Understand
2.	Why are unsafe acts more difficult to correct than unsafe conditions?	BT1	Remember
3.	What are the types of safety audits?	BT1	Remember
4.	State any four unsafe acts.	BT1	Remember
5.	What are the key elements of a safety audit?	BT2	Understand
6.	What is the role of the safety committee?	BT2	Understand
7.	Mention the roles of the lead auditor while conducting an occupational health and safety audit.	BT2	Understand
8.	Compare line and staff type safety organization.	BT1	Remember
9.	Mention the principal contents of an audit report as specified in IS 14489:1998	BT1	Remember
10.	When do we use a safety audit?	BT1	Remember
11.	What do you understand by the scope of the audit?	BT3	Apply
12.	Why are unsafe acts more difficult to correct than unsafe conditions?	BT5	Evaluate
13.	State the important characteristics of a good Nonconformity Report.	BT1	Remember
14.	How to review an audit?	BT3	Apply
15.	Mention the roles of the lead auditor while conducting an occupational health and safety audit.	BT2	Understand
16.	Define Auditing.	BT1	Remember
17.	State the importance of maintaining safety records.	BT1	Remember
18.	Compare first party and third party safety audit?	BT4	Analyse
19.	What are the unsafe conditions in the shop floor?	BT3	Apply
20.	Define safety organization. Give its objectives.	BT1	Remember
21.	List out the safety audit records.	BT1	Remember
22.	What is non-conformity reporting?	BT1	Remember
23.	Define accident.	BT1	Remember

24.	What are the different types of inspection?	BT1	Remember
25.	Discuss briefly about checklist.	BT2	Understand
PART – B (13 MARKS)			
Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	Prepare a sample job safety analysis report for painting of exterior wall of high rise building.	BT5	Evaluate
2.	Explain in detail the methodology for conducting safety audit	BT2	Understand
3.	List out and explain the responsibilities of auditor. Also mention the requirements to become a competent auditor.	BT1	Remember
4.	Prepare a list of Records to be examined during the safety audit of an engineering company?	BT5	Evaluate
5.	Prepare the list of various unsafe acts committed by workers and unsafe conditions prevailing in the chemical industry that are causing accidents	BT4	Analyse
6.	List out the contents of a safety audit report	BT5	Evaluate
7.	What is meant by non-conformity reporting? Explain how it will evolveduring an audit with some examples.	BT3	Apply
8.	Explain the terms unsafe act and unsafe condition with suitable examples.	BT4	Analyse
9.	Explain in detail how do you conduct the safety audit in a hazardous industry	BT4	Analyse
10.	Write about the importance of maintaining safety records.	BT2	Understand
11.	Prepare a check list for safety audit at a spinning mill and explain the need ofeach one.	BT4	Analyse
12.	What is Non Conformity Report? Explain the various types of Non Conformity with examples.	BT3	Apply
13.	List out and explain the responsibilities of auditor. Also mention the requirements to become a competent auditor.	BT4	Analyse
14.	Recall the important features of IS 14489: 1998 code of practice on occupational safety and health audit.	BT3	Apply
15.	You are a certified auditor for conducting occupational health and safety audit. A chemical manufacturing company has contacted you to conduct a safety audit. Explain in detail how would you plan and prepare for the audit. Also explain the activities to be carried out during	BT5	Evaluate

	on site audit.		
16.	Explain the concerns of Management towards Safety. Also explain the relevance of Safety with respect to Quality and Productivity.	BT3	Apply
17.	Write a non-conformity report for an industry for the deviation of not conducting safety meetings for several months.	BT4	Analyse
18.	Form your own checklist for a safety audit for a textile industry and explain the need for each one.	BT5	Evaluate

UNIT III: ACCIDENT INVESTIGATION AND REPORTING

Concept of an accident, reportable and non-reportable accidents, reporting to statutory authorities – principles of accident prevention – accident investigation and analysis – records for accidents, departmental accident reports, documentation of accidents – unsafe act and condition – domino sequence – supervisory role – role of safety committee –cost of accident.

PART - A (2 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	What do you mean by a reportable accident?	BT2	Understand
2.	What is the purpose of accident analysis?	BT2	Understand
3.	What are the important points to be covered while conducting an accident investigation?	BT2	Understand
4.	What are the important points to be covered while conducting an accident Investigation?	BT2	Understand
5.	Define a near-miss incident	BT1	Remember
6.	State the hierarchy of hazard control to be followed for prevention of accidents.	BT1	Remember
7.	Why is accident cost always referred to as the tip of the iceberg?	BT2	Understand
8.	What are the important points to be covered while conducting an accident investigation?	BT2	Understand
9.	State the reason for estimating accident cost?	BT1	Remember
10.	What are the causes of an accident?	BT2	Understand
11.	Why is documentation needed for an accident analysis?	BT2	Understand
12.	How are accident indices calculated?	BT2	Understand
13.	What are the important points to be covered while conducting an accident investigation?	BT2	Understand
14.	What is the supervisory role in an accident?	BT2	Understand
15.	What is the domino sequence?	BT2	Understand
16.	Why is a safety committee formed?	BT2	Understand
17.	Prepare a list of the costs of an accident.	BT1	Remember
18.	What is the purpose of accident analysis?	BT2	Understand
19.	Compare Frequency rate and Severity rate.	BT2	Understand
20.	List out the ways of cleaning and finishing foundry products.	BT1	Remember
21.	What are the types of accidents?	BT2	Understand

22.	Distinguish between reportable and non-reportable accidents.	BT2	Understand
23.	Define frequency severity incidence.	BT1	Remember
24.	What is meant by the cost of an accident?	BT2	Understand
25.	State the difference between an accident and an incident with one example.	BT1	Remember

PART – B (13 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	What are the various principles of accident prevention? Explain each of them with examples.	BT3	Apply
2.	Explain how a safety committee will be used to prevent accidents, including its roles.	BT4	Analyze
3.	Explain in detail the various steps involved in an accident investigation as recommended by OSHA.	BT4	Analyze
4.	What are the various principles of accident prevention? Explain each of them with examples.	BT3	Apply
5.	Explain the duties and responsibilities of a safety supervisor.	BT4	Analyze
6.	Explain the role of the safety committee in accident prevention.	BT4	Analyze
7.	Mention the various causative factors that can be used as a guide for detailed analysis of accidents.	BT4	Analyze
8.	Explain the role of the supervisor in accident prevention.	BT4	Analyze
9.	Illustrate how the principle of accident prevention is applied.	BT3	Apply
10.	Describe the various roles played by government agencies in creating awareness on accident prevention.	BT3	Apply
11.	Why is the hidden cost of accidents important? What are the various hidden cost elements?	BT3	Apply
12.	What are the characteristics of a good Non-Conformity Report? Prepare a Non-Conformity Report for not following a legal requirement.	BT5	Evaluate
13.	Explain in detail the role of a supervisor in accident prevention.	BT2	Understand
14.	Prepare an accident report using Form 18 of the Tamil Nadu Factories Rules.	BT5	Evaluate
15.	Prepare an accident investigation report and explain how it can be used for accident prevention.	BT5	Evaluate
16.	How is an accident documented, investigated and analysed? Explain the	BT4	Analyze

	procedure with an example.		
17.	Explain in detail how to estimate accident cost in an industry for a year.	BT4	Analyze
18.	Prepare a detailed self-contained accident investigation report including the causation factors.	BT5	Evaluate

UNIT IV: SAFETY PERFORMANCE MONITORING

ANSI (Z16.1) Recommended practices for compiling and measuring work injury experience – permanent total disabilities, permanent partial disabilities, temporary total disabilities - Calculation of accident indices, frequency rate, severity rate, frequency severity incidence, incident rate, accident rate, safety “t” score, safety activity rate – problems.

PART - A (2 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	How are accident indices calculated?	BT2	Understand
2.	What is Lost workday cases incidence rate?	BT2	Understand
3.	What do you understand by the term frequency rate?	BT2	Understand
4.	Define the term frequency rate. State why frequency rate is more measurement than severity rate.	BT1	Remember
5.	Compare Frequency rate and Severity rate.	BT3	Apply
6.	What do you understand by restricted work activity?	BT2	Understand
7.	What is the safety activity rate?	BT2	Understand
8.	Suggest various ways to utilize safety committee in accident prevention.	BT1	Remember
9.	Define the term frequency rate.	BT1	Remember
10.	What are the standard time charges for Permanent total disability and Loss of eyesight in one eye.	BT2	Understand
11.	What is the role of the safety committee?	BT2	Understand
12.	Define safety activity rate.	BT1	Remember
13.	What is the final measure of safety? Explain.	BT2	Understand
14.	Define permanent partial disability.	BT1	Remember
15.	What is the Safety “t” score?	BT2	Understand
16.	What is Incident rate?	BT2	Understand
17.	What is accident rate?	BT2	Understand
18.	Define safety activity rate.	BT1	Remember
19.	What is the reason for assigning 6000 man-days lost for a fatal accident in severity rate calculations?	BT2	Understand
20.	Compare and list at least two important differences between traditional ANSI Z16.1 and the current OSHA record-keeping system for safety performance measurement	BT3	Apply
21.	What are the benefits of safety performance monitoring?	BT2	Understand

22.	Define frequency rate.	BT1	Remember
23.	Mention some problems of safety activity rate.	BT1	Remember
24.	What is safety performance monitoring?	BT2	Understand
25.	What is a reportable accident?	BT2	Understand

PART - B (13 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	Detail the step-by-step process for estimating indirect and uninsured accident costs in an established firm.	BT4	Analyze
2.	Explain in detail the procedure to conduct a perception discrepancy survey.	BT4	Analyze
3.	Compare the number of lost workdays rate and Severity rate.	BT3	Apply
4.	Briefly explain OSHA's current record keeping requirement for incidents.	BT4	Analyze
5.	Discuss in detail about needs of safety performance monitoring to prevent accidents.	BT4	Analyze
6.	Explain safety performance indicators in detail with examples.	BT4	Analyze
7.	During 12-month period, a manufacturing company employing 300 employees has 18 injuries and 4 illnesses requiring medical treatment. In 10 injury cases out of 18 injury cases, the employee lost at least one day from work. Calculate the total injury- illness incidence rate, LWDI and traditional frequency rate. Comment whether the company is a very dangerous one.	BT5	Evaluate
8.	Firm A has 115 workers averaging 40 hours a week each. In nine Months, 3 workers were injured. Firm B has 132 workers averaging 37 hours a week each. In 10 months, 3 workers were injured. Which firm has a better frequency rate?	BT5	Evaluate
9.	State what departmental safety records are maintained.	BT4	Analyze
10.	What is safety 't' score? Explain its significance.	BT4	Analyze
11.	Explain in detail about safety training conducted in the industry for implementing safety activities.	BT4	Analyze
12.	Explain the role of the safety committee in accident prevention.	BT4	Analyze
13.	Compare traditional Z16.1 and OSHA current recordkeeping system.	BT3	Apply
14.	Explain the steps involved in calculating safety activity rate.	BT4	Analyze
15.	Estimate accident cost for an electrical short circuit that resulted in power failure for five hours in the plant and a small fire in the distribution system.	BT5	Evaluate

	100 employees were working in the plant. Write Justifications for your estimation.		
16.	Firm A has 115 workers averaging 40 hours a week each. In 9 months, 3 workers were injured. Firm B has 132 workers averaging 37 hours a week each. In 10 months, 3 workers were injured. Which firm is safe?	BT5	Evaluate
17.	Explain short notes on Incident and accident rate, safety "t" score and safety activity rate.	BT4	Analyze
18.	Develop a detailed procedure for Accident /incident Management system for an industry, including the formats for capturing, reporting and investigation.	BT5	Evaluate

UNIT V: SAFETY EDUCATION AND TRAINING

Importance of training-identification of training needs-training methods – programmes, seminars, conferences, competitions – method of promoting safe practice - motivation – communication - role of government agencies and private consulting agencies in safety training – creating awareness, awards, celebrations, safety posters, safety displays, safety pledge, safety incentive scheme, safety campaign – Domestic Safety and Training.

PART - A (2 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	What are the needs for safety training?	BT2	Understand
2.	Write a safety slogan for maintaining safety inside a machinshop.	BT1	Remember
3.	What is the final measure of safety? Explain.	BT2	Understand
4.	Distinguish between safety education and training.	BT3	Apply
5.	What is the significance of celebrating Safety Week?	BT2	Understand
6.	Mention any two national safety award schemes operated by DGFASLI.	BT1	Remember
7.	How do you identify training needs in an industry?	BT2	Understand
8.	What are the needs for safety training?	BT2	Understand
9.	Write a safety slogan for maintaining safety inside a machinshop.	BT1	Remember
10.	How to identify training needs?	BT2	Understand
11.	Write the role of government agencies in safety training.	BT1	Remember
12.	State any two national safety award schemes operated by DGFASLI and International Safety awards by the British Safety Council.	BT1	Remember
13.	What is the role of the National Examination Board for Occupational Safety and Health, UK in safety education?	BT2	Understand
14.	List out the training methods to improve safety in Industries.	BT1	Remember
15.	How do you identify training needs in an industry?	BT2	Understand
16.	How are workers motivated?	BT2	Understand
17.	Why is communication important in safety activities?	BT2	Understand
18.	Mention any two international safety award schemes operated by BritSafety Council.	BT1	Remember
19.	State four important activities carried out during safety celebrations.	BT1	Remember
20.	What is Lost workday cases incidence rate?	BT2	Understand
21.	What do you meant by Safety Mock Drill?	BT2	Understand
22.	Define the term motivation.	BT1	Remember

23.	What is the importance of safety training?	BT2	Understand
24.	List out the various roles of Government towards Safety.	BT1	Remember
25.	What is safety training?	BT2	Understand

PART - B (13 MARKS)

Sl. No	QUESTIONS	BT LEVEL	COMPETENCE
1.	Explain the effectiveness of a safety training programme in road transportation	BT4	Analyze
2.	Explain in detail the safety training conducted in the industry for implementing safety activities.	BT4	Analyze
3.	Explain the various methods of promoting safety practice in an industry.	BT4	Analyze
4.	Explain the role of the National Safety Council and Occupational Safety and Health Administration in safety education and training.	BT4	Analyze
5.	Describe the various roles played by government agencies in creating awareness on accident prevention.	BT3	Apply
6.	Explain in detail the importance of conducting a safety orientation training programme for new employees. Outline various elements of such programme.	BT4	Analyze
7.	Explain in detail how to develop a need based safety training programme for a target group.	BT4	Analyze
8.	(a) Explain the role of the National Safety Council in safety education and training. (8) (b) Explain the role of OSHA and NEBOSH in promoting safety education and Professional certifications. (8)	BT4 BT4	Analyze
9.	Explain in detail the various steps involved in the systematic design of a safety training programme.	BT4	Analyze
10.	Explain the various roles played by DGFASLI in promoting safety.	BT4	Analyze
11.	Brief about safety posters, safety pledge and safety campaign.	BT1	Remember
12.	Distinguish between LWDI of the new OSHA record keeping system and the frequency rate of traditional system.	BT3	Apply
13.	Explain the steps involved in calculating safety activity rate.	BT4	Analyze
14.	Compare on the job training and classroom training.	BT3	Apply
15.	You are a safety manager in an engineering industry. Explain how you conduct safety celebrations in your factory. Prepare a list of activities which	BT5	Evaluate

	can be used for safety celebrations.		
16.	Explain the methodology of identifying, organising, and evaluating various safety education and training requirements for an industry.	BT4	Analyze
17.	What is the role of communication in safety? Explain how it is to be carried out to be effective.	BT4	Analyze
18.	Assume that you have just joined as a safety officer with an industry which already has the problems of more accidents, poor adherence to wearing of PPE by the employees, poor involvement of various categories of employees in Safety, etc. As a Safety officer, Explain your strategies and efforts proposed for solving the same.	BT5	Evaluate