SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

V SEMESTER

1909512 - INDUSTRIAL SAFETY ENGINEERING

Regulation – 2019

Academic Year 2022 – 2023 (ODD SEMESTER)

Prepared by

S.Pradeep, Assistant Professor/Mechanical

SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

QUESTION BANK

SUBJECT / SUBJECT CODE : INDUSTRIAL SAFETY ENGINEERING / 1909512
SEM/YEAR : V / III

UNIT-I: INTRODUCTION			
Evolution of modern safety concepts – Fire prevention – Mechanical hazards – Boilers, Pressure vessels, Electrical Exposure.			
PART-A (2 Marks)			
Q.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1	Describe why occupational accident prevention is an important problem?	BT2	Understand
2	Predict, who bears the costs of work accidents?	BT2	Understand
3	In what terms is occupational injury experience usually expressed for purposes of comparison?	BT2	Understand
4	Quote two major sources of occupational injury statistics.	BT1	Remember
5	Define occupational accident.	BT1	Remember
6	Interpret, why occupational accidents are purely chance occurrences?	BT2	Understand
7	Demonstrate that, occupational accidents can be greatly reduced if proper steps are taken?	BT3	Apply
8	Point out that, the industrial injuries a phenomenon of modern times.	BT4	Analyze
9	Define workmen's compensation?	BT1	Remember
10	Describe why workmen's compensation laws were needed?	BT2	Understand
11	Define the principle of Organizational Safety	BT1	Remember
12	Define the role of management in safety	BT1	Remember

13	Which do you think is the better measure of safety performance, frequency, or severity? Why?	BT5	Evaluate
14	Analyze the relation between accidents and time lost because of work injuries?	BT4	Analyze
15	Analyze the most common causes of work injuries	BT4	Analyze
16	Evaluate strategies to prevent chemical burn injuries.	BT5	Evaluate
17	Analyze repetitive strain/soft tissue injuries.	BT4	Analyze
18	Which body parts are most susceptible to injuries? List according to the frequency of injury to each part.	BT1	Remember
19	Analyze three chemicals that frequently cause chemical burns in the workplace.	BT4	Analyze
20	Summarize three factors that contribute to heat burn injuries in the workplace.	BT5	Evaluate
21	Define Safety Engineering.	BT1	Remember
22	Define safety concept.	BT1	Remember
23	Write four points about the need for safety.	BT1	Remember
24	List out any four modern safety concepts	BT1	Remember
25	Classify different classes of fire.	BT1	Remember

PART-B (13 Marks)

Q.No	QUESTIONS	MARKS	LEVEL	COMPETECE
1	Explain the principles of management.	13	BT5	Evaluate
2	Describe about general safety measures to be adopted.	13	BT2	Understand
3	Summarize the events that led to modern safety concept.	13	BT5	Evaluate
4	Explain the history of safety management. Also Explain the evolution of modern safety concept.	13	BT5	Evaluate

5	Analyze the factors affecting means of escape during fire.	13	BT4	Analyze
6	Explain in detail about fire protection systems	13	BT5	Evaluate
7	Explain about burns and first aid procedure for burns.	13	BT5	Evaluate
8	Evaluate the root cause behind occurrence of fire accidents?	13	BT5	Evaluate
9	Explain the purpose of regular testing of safety valves in boilers.	13	BT5	Evaluate
10	Prepare the detailed check list for ensuring the safe operation of high pressure boiler.	13	BT6	Create
11	Describe, how to conduct destructive and nondestructive testing?	13	BT2	Understand
12	Explain Dalton's law of partial pressures.	13	BT5	Evaluate
13	Analyze the parameters to be considered in electrical power shock hazards and explain?	13	BT4	Analyze
14	Explain the term earthing and earthing resistance and write a note on maintaining an earth pit.	13	BT5	Evaluate
15	Explain in detail about the classes of fire.	13	BT2	Understand
16	Prepare a sample job safety analysis report for a hazardous job in a construction site.	13	BT5	Evaluate
17	Describe the steps involved in inspection of Pressure vessels.	13	BT2	Understand
18	Explain various mechanical hazards in construction site.	13	BT4	Analyze
PART-C (15 Marks)				
1	Assess various functions and activities of safety Engineering department. Highlight any four functions which you feel very important for preventing accidents.	15	BT5	Evaluate
2	What is job safety analysis? Explain how hob safety analysis is carried out with an example. Write the safety benefits of analysis.	15	BT5	Evaluate
3	You are the owner of the foundry industry. Develop the steps taken to completely arrest fire accident.	15	BT6	Create

VALLIAMMAI ENGINEERING COLLEGE SRM

4	Create a check list for safe operation of boilers.	15	BT6	Create
5	With a case study explain the impact of pressure vessel explosion in any industry.	15	BT6	Create

VALLIAMMAI ENGINEERING COLLEGE
SRM

UNIT-II: CHEMICAL HAZARDS			
Chemical exposure – Toxic materials – Radiation Ionizing and Non-ionizing Radiation - Industrial Hygiene – Industrial Toxicology.			
PART – A (2 Marks)			
Q.No	**QUESTIONS**	**LEVEL**	**COMPETECE**
1	List out various industrial chemicals that are harmful to human	BT1	Remember
2	Quote any two toxic gases and chemicals.	BT1	Remember
3	Analyze fume	BT4	Analyze
4	Differentiate exposure and dosage	BT2	Understand
5	Define toxic substance.	BT1	Remember
6	List the factors that determine the effect that a toxic substance will have.	BT1	Remember
7	Quote the most common routes of entry for toxic substances	BT1	Remember
8	List the responsibilities of an industrial hygienist	BT1	Remember
9	List the most important considerations when evaluating hazards in the workplace	BT1	Remember
10	Quote five generic prevention and control strategies that can be used in any workplace.	BT1	Remember
11	Analyze fog and mist.	BT4	Apply
12	Describe air pollution.	BT2	Understand
13	Analyze gas and vapor monitors.	BT4	Analyze
14	Summarize the types of air sampling instruments.	BT2	Understand

VALLIAMMAI ENGINEERING COLLEGE SRM

15	List out some common techniques to analyze gaseous pollutants.	BT1	Remember
16	Describe about air sampling types.	BT2	Understand
17	Quote the permissible limit for air pollutants in industrial area.	BT1	Remember
18	Describe the major sources of outdoor air pollution?	BT2	Understand
19	Quote the types of poisoning due to chemicals?	BT1	Remember
20	List out common chemical hazards you come across in daily life.	BT1	Remember
21	What is the main purpose of hazard identification?	BT1	Remember
22	Mention the data required for hazard identification.	BT1	Remember
23	What is the importance of hazard identification in chemical hazard?	BT1	Remember
24	What is industrial hygiene?	BT1	Remember
25	Why is industrial hygiene important?	BT1	Remember

PART-B (13 Marks)

Q.No	QUESTIONS	MARKS	LEVEL	COMPETECE
1	What concepts are considered while evaluating exposure thresholds?	13	BT5	Evaluate
2	Explain about chemical hazards on human.	13	BT4	Analyze
3	Explain ambient air sampling techniques.	13	BT4	Analyze
4	Analyze about the control techniques of air pollution.	13	BT4	Analyze
5	Explain in detail about TLV.	13	BT4	Analyze
6	Explain about sampling techniques.	13	BT4	Analyze
7	Explain in detail about toxic gases that cause air pollution.	13	BT5	Evaluate

8	Express your views on controlling air pollution in future.	13	BT4	Analyze
9	Explain Radiation Ionizing	13	BT5	Evaluate
10	Explain Non-ionizing Radiation	13	BT4	Analyze
11	Explain the following terms: dose threshold, lethal dose, and lethal concentration	13	BT4	Analyze
12	Differentiate acute and chronic effects and exposures.	13	BT2	Understand
13	Explain Industrial Hygiene.	13	BT4	Analyze
14	Explain Industrial Toxicology	13	BT4	Analyze
15	What are the different parameters of safety in chemical industry?	13	BT4	Analyze
16	Explain about the different modes of hazardous control.	13	BT2	Understand
17	Explain in detail about toxic gases that cause air pollution.	13	BT4	Analyze
18	How can we determine the chemical exposure?	13	BT4	Analyze
	PART – C (15 Marks)			
1	Explain most common routes of entry for toxic substances.	15	BT5	Evaluate
2	List and explain the various classifications of airborne toxics.	15	BT5	Evaluate
3	Formulate Radiation Ionizing and Non-ionizing Radiation	15	BT6	Create
4	How do you ensure Industrial Hygiene? And formulate control measures in Industrial Toxicology.	15	BT6	Create
5	Describe the ways by which you can protect the environment from toxic components of chemical industry.	15	BT5	Evaluate

VALLIAMMAI ENGINEERING COLLEGE SRM

UNIT-III: ENVIRONMENTAL CONTROL			
Industrial Health Hazards – Environmental Control – Industrial Noise - Noise measuring instruments, Control of Noise, Vibration, - Personal Protection.			
PART – A (2 Marks)			
Q.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1	Define hazardous process.	BT1	Remember
2	Define Industrial Health.	BT1	Remember
3	Quote importance of Industrial Health.	BT1	Remember
4	List out the Causes of Bad Health (or) Reasons for Bad Health.	BT1	Remember
5	Describe Psychological Hazards.	BT2	Understand
6	Interpret the significance and scope of environmental education.	BT2	Understand
7	Define deforestation.	BT1	Remember
8	Evaluate the role and responsibility of an individual in the prevention of pollution?	BT5	Evaluate
9	Analyze noise.	BT4	Analyze
10	Summarize the classification of noise.	BT2	Understand
11	Classify the types of External noise.	BT4	Analyze
12	Classify the types of internal noise.	BT4	Analyze
13	Quote the types of extraterrestrial noise and write their origin.	BT1	Remember
14	Analyze the reason to measure noise in the workplace.	BT4	Analyze
15	Describe, how do you identify noise problems in the workplace?	BT2	Understand
16	Quote the types of instruments are used for measuring noise.	BT1	Remember

SAINTGITS ENGINEERING COLLEGE SRM

17	Describe sound level meter (SLM)?	BT2	Understand
18	Define noise dosimeter.	BT1	Remember
19	Describe, how can you measure vibration?	BT2	Understand
20	Quote 5 examples of PPE.	BT1	Remember
21	What is noise pollution?	BT1	Remember
22	What is the importance of PPE?	BT1	Remember
23	Mention the PPE used to manage the external noise.	BT2	Understand
24	Mention the methods of controlling noise level.	BT1	Remember
25	Classify various PPE used in safety protection.	BT1	Remember

PART-B (13 Marks)

Q.No	QUESTIONS	MARKS	LEVEL	COMPETENCE
1	Explain the relation between eye strain and VDT.	13	BT5	Evaluate
2	Does prolonged use of VDT affect a worker's health? Conclude.	13	BT5	Evaluate
3	With industrial robots gaining popularity, would factories be people less in the future? Explain.	13	BT5	Evaluate
4	Explain, how can safety measures help workers in an automated system?	13	BT5	Evaluate
5	How can we ensure that automation does not overlook safety and health for short-term productivity gains? Explain	13	BT5	Evaluate
6	Explain, how can safety training help, in workers' automation at workplace?	13	BT5	Evaluate
7	Explain six safety and health problems widely associated with office automation.	13	BT5	Evaluate
8	Define the term *maladaptation*. Explain how it manifests itself in workers.	13	BT5	Evaluate

9	Explain five strategies for minimizing the potential for occurrences of maladaptation.	13	BT5	Evaluate
10	Analyse the process of audiometric evaluation.	13	BT4	Analyze
11	Explain the OSHA regulation regarding hearing conservation programs.	13	BT5	Evaluate
12	Explain noise-induced hearing loss at workplace.	13	BT5	Evaluate
13	Explain noise control strategies.	13	BT5	Evaluate
14	Explain, how does the vibration exposure occur?	13	BT5	Evaluate
15	Describe, how can you measure vibration?	13	BT5	Evaluate
16	Explain about various PPE and its significant role in safety protection.	13	BT5	Evaluate
17	Describe various noise problems produced in a workplace and how do safeguard the workers to a safe environment?	13	BT5	Evaluate
18	Explain in detail about the importance of environmental education.	13	BT5	Evaluate
	PART – C (15 Marks)			
1	Design a detailed procedure to eliminate Industrial Health Hazards.	15	BT6	Create
2	Develop a detailed procedure to ensure environmental safety.	15	BT5	Evaluate
3	With the help of noise measuring instruments, explain noise control procedure.	15	BT6	Create
4	Summarize the general recommendations for physical control of the Hazards in your choice of personnel protective equipment.	15	BT5	Evaluate
5	Explain the noise exposure sound level and permissible time as per OSHA standards.	15	BT5	Evaluate

VALLIAMMAI ENGINEERING COLLEGE SRM

UNIT-IV: HAZARD ANALYSIS			
System Safety Analysis –Techniques – Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), HAZOP analysis and Risk Assessment.			
PART – A (2 Marks)			
Q.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1	Compare FTA with FMEA.	BT5	Evaluate
2	Define HAZAN.	BT1	Remember
3	Define fault tree analysis.	BT1	Remember
4	Formulate Event Tree Analysis.	BT6	Create
5	Point out, in what way FMEA is useful to improve a system design?	BT4	Analyze
6	In industry how do you apply FMEA?	BT3	Apply
7	List the main phases of FMEA.	BT1	Remember
8	Describe logic symbols.	BT2	Understand
9	Define ETA.	BT1	Remember
10	Define Extrapolation.	BT1	Remember
11	Describe PHA.	BT2	Understand
12	Define HEA	BT1	Remember
13	Describe TOR.	BT2	Understand
14	Define HAZOP	BT1	Remember
15	List out the fundamentals of hazard prevention.	BT1	Remember
16	Define risk analysis.	BT1	Remember

VALLIAMMAI ENGINEERING COLLEGE SRM

17	Analyze, what will happen if hazard is left uncorrected?	BT4	Analyze
18	Summarize risk assessment.	BT2	Understand
19	Define the role of safety management	BT1	Remember
20	Describe, how do you find out criticality?	BT2	Understand
21	What are the various risk analysis construction site.	BT4	Analyze
22	Define the role of safety management in accident.	BT2	Understand
23	State the importance of HEA.	BT1	Remember
24	What is the main use of FTA?	BT2	Understand
25	What is the importance of risk assessment?	BT2	Understand

PART-B (13 Marks)				
Q.No	**QUESTIONS**	**MARKS**	**LEVEL**	**COMPETENCE**
1	What is fault tree analysis? Explain the logic symbols used in fault tree.	13	BT5	Evaluate
2	What is meant by FMEA? Explain its types.	13	BT1	Remember
3	Explain PHA.	13	BT5	Evaluate
4	Analyze in detail about human error analysis.	13	BT4	Analyze
5	How is HAZOP conducted? Explain in detail with a case study.	13	BT5	Evaluate
6	Explain in detail about hazard monitoring.	13	BT5	Evaluate
7	Explain in detail about Preliminary Hazard Analysis.	13	BT5	Evaluate
8	Illustrate the steps involved in risk estimation.	13	BT3	Apply
9	Explain how hazard identification, risk assessment and control procedures are followed in industries with suitable examples.	13	BT5	Evaluate

10	Describe the various risk encountered during hazard monitoring. What are the approaches for accepting risk levels? Explain.	13	BT5	Evaluate
11	Explain the procedure and methodology followed in risk assessment.	13	BT5	Evaluate
12	Explain the various steps involved in performing a "what if analysis" for an industrial set up.	13	BT5	Evaluate
13	Formulate the procedure necessary for the safety review in an industry.	13	BT6	Create
14	Analyze in detail about risk issue.	13	BT4	Analyze
15	Explain in detail about risk estimation with an example.	13	BT5	Evaluate
16	Explain various methods of hazard prevention.	13	BT5	Evaluate
17	Explain the importance of risk assessment?	13	BT6	Create
18	Discuss about the importance of hazard monitoring.	13	BT4	Analyze
	PART-C (15 Marks)			
1	You are on authorized signatory in the process industry. Develop a detailed methodology for avoiding the risks.	15	BT6	Create
2	Create a hazard operability studies for the service industry.	15	BT6	Create
3	Create a systematic procedure to adopt FTA and FMEA in a Foundry	15	BT6	Create
4	Formulate the factors to be considered for risk assessment.	15	BT6	Create
5	Explain the procedure necessary for the safety review in a construction industry.	15	BT5	Evaluate

VALLIAMMAI ENGINEERING COLLEGE SRM

UNIT V SAFETY REGULATIONS			
Explosions – Disaster management – catastrophe control, hazard control, Factories Act, Safety regulations Product safety – case studies.			
PART – A (2 Marks)			
Q.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1	Differentiate combustion and explosion.	BT2	Understand
2	Is explosion a type of combustion?	BT1	Remember
3	Define catastrophe.	BT1	Remember
4	Describe, how do you control catastrophe?	BT2	Understand
5	Quote the purpose of emergency control headquarters?	BT1	Remember
6	Do you need an administrator for disaster control? If so, why and what should be his position?	BT2	Understand
7	Quote the provision should be made for rescue union.	BT1	Remember
8	What sort of training may well be included in preparation for disaster Control?	BT2	Understand
9	Define factory.	BT1	Remember
10	Whether any establishment is a factory?	BT2	Understand
11	Quote main objectives of the factories act 1948.	BT1	Remember
12	Describe, how the inspectors are appointed in factories.	BT2	Understand
13	List out the powers of inspectors	BT1	Remember
14	Quote the general duties of the occupier?	BT1	Remember
15	Write a short note ‘occupier’ as defined under factories act.	BT1	Remember
16	Define the term ‘worker ‘used in factories act.	BT1	Remember

17	Define adult as per factories act.	BT1	Remember
18	Quote the provisions of the factories act, 1948, relating to health of workers.	BT1	Remember
19	List out the provisions of factories act regarding the employment of young persons.	BT1	Remember
20	Quote the duties of certifying surgeons?	BT1	Remember
21	Compare the terms hazard and risk.	BT1	Remember
22	What is disaster control?	BT1	Remember
23	What is the importance of safety regulations?	BT1	Remember
24	Mention the need of product safety.	BT1	Remember
25	Why factory act is very important in safety regulation?	BT1	Remember

PART-B (13 Marks)

Q.No	QUESTIONS	MARKS	LEVEL	COMPETENCE
1	Describe various groups or individuals who might be part of a disaster control organization.	13	BT2	Understand
2	Discuss specific steps that might be taken in preparation for the kind of disaster you think most reasonably possible in a large plant or other business organization with which you are familiar.	13	BT1	Remember
3	Describe the procedure of appointment of inspectors under factories act 1948.	13	BT2	Understand
4	Explain in detail about the duties of manufactures.	13	BT5	Evaluate
5	Explain in detail about the duties of powers of inspectors as per factories act 1948.	13	BT5	Evaluate
6	Explain the rules relating to approval, licensing and registration of factories, what is notice by occupier? State the contents of the notice by occupier.	13	BT5	Evaluate

7	Explain the circumstance under which the occupier or the manager may be exempted from liability under the factories act 1948?	13	BT5	Evaluate
8	Briefly explain the provisions of the factories act 1948, relating to the health of the workers	13	BT5	Evaluate
9	Briefly explain the provisions laid down in the factories act for the purpose of securing the safety of young persons, women and children.	13	BT5	Evaluate
10	Briefly summarize the different provisions of the factories act 1948, for the welfare of workers in a factory.	13	BT5	Evaluate
11	Explain catastrophe control.	13	BT5	Evaluate
12	Explain hazard control method.	13	BT5	Evaluate
13	Recommend few Safety regulations to be followed in industry.	13	BT5	Evaluate
14	Explain about safety and health.	13	BT5	Evaluate
15	Explain the role of safety inspector in inspection.	13	BT5	Evaluate
16	Explain the method of hazard control in chemical industry.	13	BT5	Evaluate
17	State the importance of safety regulations in detail.	13	BT5	Evaluate
18	List out the Safety regulations adopted in industry to control accident.	13	BT5	Evaluate
PART – C (15 Marks)				
1	Explain the following statement: “we produce no dangerous products, handle no highly flammable materials, are not in a region very much exposed to floods or tornadoes; and consequently, disaster control is not a problem for us”.	15	BT5	Evaluate
2	Create the relative importance for handling an emergency of specific disaster control preparations as compared with good general organization, facilities and operations.	15	BT6	Create
3	Explain in detail about Bhopal Gas tragedy.	15	BT5	Evaluate

VALLIAMMAI ENGINEERING COLLEGE SRM

4	Explain in detail about the case study of process and chemical handling.	15	BT5	Evaluate
5	Explain with a case study on disaster management happened at any one industry.	15	BT5	Evaluate

VALLIAMMAI ENGINEERING COLLEGE
SRM