

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous institution)

SRM Nagar, Kattankulathur– 603203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK



VIII SEMESTER

1909804 - INDUSTRIAL SAFETY

Regulation–2019

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DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

SUBJECT NAME : INDUSTRIAL SAFETY

Sem / Year: VIII / IV

UNIT 1: BASICS OF SAFETY ENGINEERING & ACTS			
Evolution of modern safety concept – Safety audit – Acts: Factories act – 1948 – Statutory authorities – Tamil Nadu factories Rules 1950 under safety and health – Environment act – 1986 – Air act 1981, Water act 1974 – other acts; Safety in industries – General safety concepts, machine guarding, hazards in metal removing process, welding process, cold and hot working process. Introduction to Electrical Acts.			
<u>PART-A</u>			
Q.No.	Questions	BT Level	Competence
1.	Define Factory.	BT1	Remember
2.	Define term Occupier as per factory act 1948.	BT1	Remember
3.	Difference between adult and adolescent as per factory act 1948 .	BT4	Analyse
4.	Describe the term prime mover as per factory act 1948.	BT2	Understand
5.	Explain the term transmission machinery as per factory act.	BT2	Understand
6.	Explain the term Premises and Precinct as per factory act 1948.	BT2	Understand
7.	List the condition of premises to be considered as factory.	BT1	Remember
8.	State the duties of the inspector.	BT1	Remember
9.	Describe the term "hazardous process".	BT2	Understand
10.	Define the term "environment".	BT1	Remember
11.	List the power given to environmental protection authority as per environmental protection act 1986.	BT1	Remember
12.	Describe the term “air pollutant”.	BT2	Understand
13.	Define the term “approved appliance” as per air act 1981.	BT1	Remember
14.	Define the term “control equipment” as per air act 1981	BT1	Remember
15.	Explain the term “trade effluent”.	BT2	Understand

16.	List out the types of machine safeguards that can be used to protect workers and personnel in the immediate vicinity of machinery.	BT1	Remember
17.	State the functions of safe guarding devices.	BT1	Remember
18.	What is the fume plume?	BT1	Remember
19.	How do I sense the hazardous materials that exist in base metal and residual chemicals of base metal or consumables as wire or gases I am using?	BT3	Apply
20.	What are the storage need for oxygen, acetylene, and other gases?	BT1	Remember
21.	How to define MAPP gas?	BT1	Remember
22.	Explain the term natural ventilation in welding safety context.	BT2	Understand
23.	Describe the term mechanical ventilation in welding safety context.	BT2	Understand
24.	List out the feature of satisfactory ventilation in welding process.	BT1	Remember
25.	How to define PPP in welding aspect?	BT1	Remember

PART-B

Q.No	Questions	Marks	BT Level	Competence
1.	Explain the term occupier in details, and also state the general duties of the occupier.	13	BT2	Understand
2.	a) Explain the term Manufacturing process, state the condition for a process to be considered as manufacturing process. b) Explain the term worker, state the condition for a person to be considered as worker.	7 6	BT2 BT2	Understand Understand
3.	Explain the powers of inspector in the factories act 1948.	13	BT2	Understand
4.	Who are the Certifying Surgeons? How are they appointed? What are their duties?	13	BT4	Analyse
5.	Explain in detail about the condition of factory in order to maintain the health of a employees.	13	BT2	Understand
6.	What are the provisions of the factories Act relating to hazardous process?	13	BT4	Analyse

7.	Enumerate the provisions relating to welfare of workers?	13	BT1	Remember
8.	Discuss the various provisions governing working hours of adults?	13	BT2	Understand
9.	What are the provisions for grant of annual leave with pay?	13	BT1	Remember
10.	Explain the powers of central government to take measures to protect and improve environment as per environmental act 1986.	13	BT2	Understand
11.	Explain in detail about environmental protection act 1986 background, constitutional provision, features and drawback.	13	BT2	Understand
12.	Explain the powers and functions of central board and also state board as per air act 1981.	13	BT2	Understand
13.	Explain the powers and functions of central board and also state board as per water act 1974.	13	BT2	Understand
14.	Explain the golden safety rule for machine guarding in various industrial operations.	13	BT2	Understand
15.	Explain the type of machine guards in details and also list the general safety precautions while handling industrial machines.	13	BT2	Understand
16.	What are the OSHA Requirements for Machine Guarding? what happens when you violate OSHA's machine guarding requirement?	13	BT4	Analyse
17.	Explain the top 12 Welding Safety Tips to Overcome Welding Risks in industries.	13	BT2	Understand
18.	What are the tips to follow when using protective clothing? Explain in detail.	13	BT4	Analyse

PART-C

1.	What are the safety measures provided for under the Factories Act for the workers working at or near the machine?	15	BT5	Evaluate
2.	Is it necessary for all the factories to appoint safety officer? If not what should be the minimum number of	15	BT4	Analyse

	workers in the factories? What do you mean by hazardous process?			
3.	Explain the powers of inspectors to entry, inspection and take samples as per environmental protection act 1986.	15	BT2	Understand
4.	Write a detailed essay on machine guarding and its approaches with relevant information's.	15	BT5	Evaluate
5.	Write a detailed essay on electricity act 2003 and its basic features.	15	BT5	Evaluate



UNIT-II: SAFETY MANAGEMENT

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

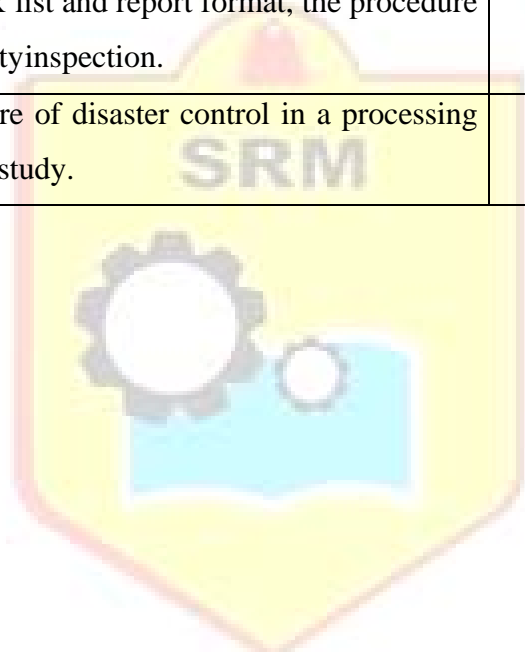
Q.No.	Questions	BT Level	Competence
1.	Define Safety Engineering	BT1	Remember
2.	Explain the relation between safety and productivity.	BT2	Understand
3.	Define the principles of Organizational Safety.	BT1	Remember
4.	Define safety concept.	BT1	Remember
5.	Define the role of management in safety.	BT1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

24.	What are the advantages of damage control system?	BT2	Understand	
25.	What are the techniques of safety management?	BT2	Understand	
<u>PART-B</u>				
Q.No	Questions	Marks	BT Level	Competence
1.	Explain about the principles of management.	13	BT2	Understand
2.	Describe about general safety measures to be adopted.	13	BT2	Understand
3.	What are the various steps involved in man-made disaster control? Explain with a case study.	13	BT5	Evaluate
4.	List the elements of a standard safety policy.	13	BT1	Remember
5.	Summarize the events that led to modern safety concept.	13	BT2	Understand
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 disaster.	13	BT5	Evaluate
7.	What is job safety analysis? Explain how job safety analysis is carried out with an example. Write the safety benefits of analysis.	13	BT4	Analyse
8.	Indemnification by employer is ineffective. Justify	13	BT5	Evaluate
9.	Explain the history of safety management. Also Explain the evolution of modern safety concept.	13	BT2	Understand
10.	Explain the principles of safety management with various approach.	13	BT2	Understand
11.	Summarize the events that led to modern safety concept.	13	BT2	Understand
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.	13	BT4	Analyse
13.	Prepare a sample job safety analysis report for a hazardous job in a construction site.	13	BT6	Create
14.	Write in detail essay about the managerial responsibilities in safety issues.	13	BT5	Evaluate
15.	Explain Incident Recall Technique in detail.	13	BT2	Understand
16.	Explain planning for safety in optimization of productivity.	13	BT2	Understand
17.	How is the performance of supervisors evaluated on	13	BT5	Evaluate

	safety? Discuss.			
18.	Explain the functions of safety management in detail.	13	BT2	Understand

PART-C

1.	Why Safety Committees are required in construction sites? Explain the advantages of Safety Committees.	15	BT5	Evaluate
2.	Discuss briefly about various functions and activities of Safety Engineering department. Highlight any four functions which you feel very important for preventing accidents.	15	BT2	Understand
3.	Explain in detail about safety procedures to be followed while operating wood working machinery.	15	BT2	Understand
4.	Explain with a check list and report format, the procedure to conduct plant safety inspection.	15	BT2	Understand
5.	Explain the procedure of disaster control in a processing industry with a case study.	15	BT2	Understand



UNIT III: ACCIDENT INVESTIGATION AND REPORTING

Concept of an accident, reportable and non-reportable accidents, unsafe act and condition – Principles of accident prevention, Supervisory role - Role of safety committee – Accident causation models - Cost of accident. Overall accident investigation process - Response to accidents, India reporting requirement, Planning document, Planning matrix, Investigators Kit, Functions of investigator, Four types of evidences, Records of accidents, Accident reports - Class exercise with case study.

PART A

Q.No.	Questions	BT Level	Competence
1.	What do you mean by 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 accident investigation?	BT2	Understand
4.	What are the safety precautions to be covered while conducting accident Investigation?	BT2	Understand
5.	Define near miss incident.	BT1	Remember
6.	State the hierarchy of hazard control to be followed for prevention of accident.	BT1	Remember
7.	Why accident cost is always referred to tip of the ice berg?	BT4	Analyse
8.	What are the important points to be covered while conducting accident investigation?	BT1	Remember
9.	State the reason for estimating accident cost?	BT1	Remember
10.	What are the causes of accident?	BT2	Understand
11.	Why documentation needed for an accident analysis?	BT4	Analyse
12.	How accident indices are calculated?	BT4	Analyse
13.	What are the important points to be covered while conducting accident investigation?	BT2	Understand
14.	What is the supervisory role in accident?	BT2	Understand
15.	What is Domino sequence?	BT2	Understand
16.	Why safety committee is formed?	BT4	Analyse
17.	Prepare the list of cost of accident.	BT1	Remember
18.	What is the purpose of accident analysis?	BT2	Understand
19.	Compare Frequency rate and Severity rate.	BT4	Analyse

20.	List out the ways of cleaning and finishing of foundry product.	BT1	Remember
21.	What are the types of accidents?	BT2	Understand
22.	Distinguish between reportable and non-reportable accidents.	BT4	Analyse
23.	Define frequency severity incidence.	BT1	Remember
24.	What is meant by cost of accident?	BT2	Understand
25.	State the difference between Accident and Incident with one example.	BT1	Remember

PART-B

Q.No	Questions	Marks	BT Level	Competence
1.	What are the various principles of accident prevention? Explain each of them with examples.	13	BT2	Understand
2.	Explain how safety committee will be used to prevent accidents with its roles.	13	BT5	Evaluate
3.	Explain in detail about various steps involved in an accident investigation as recommended by OSHA.	13	BT2	Understand
4.	What are the various principles of accident prevention? Explain each of them with examples.	13	BT2	Understand
5.	Explain the duties and responsibilities of safety supervisor.	13	BT2	Understand
6.	Explain the role of safety committee in accident prevention.	13	BT2	Understand
7.	Mention the various causative factors that can be used as a guide for detailed analysis of accidents.	13	BT4	Analyse
8.	Explain the role of supervisor in accident prevention.	13	BT2	Understand
9.	Illustrate how the principle of accident prevention is applied.	13	BT5	Evaluate
10.	Describe the various roles played by government agencies in creating awareness on accident prevention.	13	BT2	Understand
11.	Why hidden cost of accidents is important? What are the various hidden cost elements?	13	BT4	Analyse
12.	What are the characteristics of good Non Conformity Report? Prepare a Non Conformity Report for not following a legal requirement.	13	BT6	Create

13.	Explain in detail, the role of supervisor in accident prevention.	13	BT2	Understand
14.	Prepare a accident report using the Form 18 of Tamil Nadu Factories rules.	13	BT6	Create
15.	Explain accident investigation and analysis.	13	BT5	Evaluate
16.	How an accident is documented, investigated and analysed? Explain the procedure with an example.	13	BT5	Evaluate
17.	Explain the principles of accident prevention.	13	BT2	Understand
18.	Explain how the records for accidents are maintained and analyzed.	13	BT4	Analyse

PART-C

1.	Prepare an accident investigation report and explain how it can be used for accident prevention.	15	BT6	Create
2.	Explain in detail how to estimate accident cost in an industry for a year.	15	BT4	Analyse
3.	Prepare an accident investigation report and analysis with an example in an automobile industry.	15	BT6	Create
4.	What is the importance of accident report documentation? Explain with an example the distribution of accident reports and investigation reports. Furnish the reasons for such distribution.	15	BT5	Evaluate
5.	Prepare a detailed self-contained accident investigation report including the causation factors.	15	BT6	Create

UNIT IV: SAFETY PERFORMANCE MONITORING

Reactive and proactive monitoring techniques - 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

Q.No.	Questions	BT Level	Competence
1.	How accident indices are calculated?	BT4	Analyse
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.	BT4	Analyse
6.	What do you understand by restricted work activity?	BT2	Understand
7.	What is safety activity rate?	BT2	Understand
8.	Suggest various ways to utilize safety committee in accident prevention.	BT5	Evaluate
9.	Define the term frequency rate.	BT1	Remember
10.	What are the standard time charges for the following? a) Permanent total disability. b) Loss of eye sight in one eye.	BT2	Understand
11.	What is the role of 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.	BT2	Understand
15.	What is 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 fatal accident in severity rate calculations?	BT3	Apply
20.	Compare and list at least two important differences between traditional ANSI Z16.1 and OSHA current record keeping	BT4	Analyse

	system for safety performance measurement		
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 reportable accident?	BT2	Understand

PART - B

Q.No	Questions	Marks	BT Level	Competence
1.	Explain in detail how do you estimate Average Uninsured cost in a established company.	13	BT2	Understand
2.	Explain in detail the procedure to conduct perception discrepansurvey?	13	BT2	Understand
3.	Compare number of lost workdays rate and Severity rate.	13	BT4	Analyse
4.	Briefly explain OSHA current record keeping requirement for incidents.	13	BT2	Understand
5.	Discuss in detail about needs of safety performance monitoring to prevent accidents.	13	BT5	Evaluate
6.	Explain safety performance indicators in detail with examples.	13	BT2	Understand
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.	13	BT6	Create
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?	13	BT6	Create

9.	State what departmental safety records are maintained.	13	BT1	Remember
10.	What is safety 't' score? Explain its significance.	13	BT2	Understand
11.	Explain in detail about safety training conducted in the industry for implementing safety activities.	13	BT2	Understand
12.	Explain the role of safety committee in accident prevention.	13	BT2	Understand
13.	Compare traditional Z16.1 and OSHA current record keeping system.	13	BT4	Analyse
14.	Explain the steps involved in calculating safety activity rate.	13	BT2	Understand
15.	Classify the accidents depends on its severity and man days loss, with an example.	13	BT2	Understand
16.	Explain the practices for compiling and measuring work injury.	13	BT2	Understand
17.	Explain short notes on Incident and accident rate, safety "t" score and safety activity rate.	13	BT2	Understand
18.	Compare the different types of disabilities.	13	BT4	Analyse

PART-C

1.	Estimate accident cost for a Electrical short circuit which resulted in power failure for five hours in the plant and a small fire in distribution system. There were 100 employees working in the plant. Write Justifications for your estimation.	15	BT6	Create
2.	a) What is frequency severity incidence and total injury illness incidence? b) Explain the steps involved in calculating safety activity rate.	8 7	BT2 BT2	Understand Understand
3.	Discuss in detail about needs of safety performance monitoring to prevent accidents.	15	BT5	Evaluate
4.	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?	15	BT5	Evaluate

5.	Evolve a detailed procedure for Accident / incident Management system for an industry including the formats for capturing, reporting and investigation.	15	BT6	Create
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UNIT V: SAFETY EDUCATION AND TRAINING

Importance of training - identification of training needs-training methods – programme, 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

Q.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 machine shop.	BT1	Remember
3.	What is the final measure of safety? Explain.	BT2	Understand
4.	Distinguish between safety education and training.	BT4	Analyse
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 need in an manufacturing industry?	BT4	Analyse
8.	What are the needs for safety training?	BT2	Understand
9.	Write a safety slogan for maintaining safety inside a welding shop.	BT1	Remember
10.	How to identify the training needs in an service industry?	BT4	Analyse
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 British Safety Council.	BT1	Remember
13.	What is the role of National Examination Board for Occupational Safety and Health, UK in safety education?	BT2	Understanding
14.	List out the training methods to improve safety in Industries.	BT1	Remember
15.	How do you identify training need in hazard industry?	BT4	Analyse
16.	How you will motivate the workers?	BT4	Analyse
17.	Why communication is important in safety activities?	BT4	Analyse

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	Understanding
21.	What do you meant by Safety Mock Drill?	BT2	Understanding
22.	Define the term motivation.	BT1	Remember
23.	What is the importance of safety training?	BT2	Understanding
24.	List out the various roles of Government towards Safety.	BT1	Remember
25.	What is safety training?	BT2	Understanding

PART-B

Q.No	Questions	Marks	BT Level	Competence
1.	Explain the effectiveness of safety training programme in roadtransportation	13	BT2	Understand
2.	Explain in detail about safety training conducted in the industry forimplementing safety activities.	13	BT2	Understand
3.	Explain the various methods of promoting safety practice in an industry.	13	BT2	Understand
4.	Explain the role of National Safety Council and Occupational Safety and Health administration in safety education and training.	13	BT2	Understand
5.	Describe the various roles played by government agencies in creating awareness on accident prevention.	13	BT2	Understand
6.	Explain in detail the importance of conducting safety orientation training programme for new employees. Outline various elements of such programme.	13	BT2	Understand
7.	Explain in detail how to develop a need based safety training programmefor a target group.	13	BT5	Evaluate
8.	a) Explain the role of National safety council in safety education andtraining.	7	BT2	Understand
	b) Explain the role of OSHA and NEBOSH in promoting safety education and Professional	6	BT2	Understand

	certifications.			
9.	Explain in detail, various steps involved in systematic design of safety training programme.	13	BT6	Create
10.	Explain the various role played by DGFASLI in promoting safety.	13	BT2	Understand
11.	Brief about safety posters, safety pledge and safety campaign.	13	BT2	Understand
12.	Distinguish between LWDI of new OSHA record keeping system and frequency rate of traditional system.	13	BT4	Analyse
13.	Explain the steps involved in calculating safety activity rate.	13	BT2	Understand
14.	Compare on the job training and class room training.	13	BT4	Analyse
15.	Explain the needs and types of safety training for a refinery plant.	13	BT2	Understand
16.	Explain the methodology of identifying, organizing and evaluating various Safety educations and training requirements for an industry.	13	BT5	Evaluate
17.	What is the role of communication in safety? Explain how it is to be carried out to be effective.	13	BT2	Understand
18.	Explain the types of media available for communication of safety messages.	13	BT2	Understand

PART-C

1.	You are a safety manager in an engineering industry. Explain how you conduct safety celebration in your factory. Prepare a list of activities which can be used for safety celebrations.	15	BT6	Create
2.	Prepare a plan for celebrating 'National Safety Day'.	15	BT6	Create
3.	Prepare a list of activities which can be used for safety celebrations.	15	BT6	Create
4.	Explain briefly the procedure to conduct perception discrepancy survey.	15	BT2	Understand
5.	Assume that you have just joined as a safety officer	15	BT6	Create

	<p>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.</p>			
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