SRM VALLIAMMAI ENGINEERINGCOLLEGE

SRM Nagar, Kattankulathur– 603203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTIONBANK

I SEMESTER (M.E - ISE)

1914105 - PLANT LAYOUT AND MATERIALS HANDLING

Regulations–2019

Academic Year 2021-22

Prepared by

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SUBJECT : 1914105 - PLANT LAYOUT AND MATERIALS HANDLING

SEM / YEAR : I / M.E ISE

UNIT I: PLANT LOCATION

UNIT-I - SYLLABUS

Selection of plant locations, territorial parameters, considerations of land, water, electricity, location for waste treatment and disposal, further expansions, Safe location of chemical storages, LPG, LNG, CNG, acetylene, ammonia, chlorine, explosives and propellants.

PART - A (2 MARKS)

Sl.No	QUESTIONS	LEVEL	COMPETENCE
1.	Mention the advantages of urban and rural sites.	BT2	Understand
2.	How do you select safe storage for chemicals?	BT1	Remember
3.	What do you mean by territorial parameters?	BT6	Create
4.	Coimbatore is familiar for textile industries. Mention the reasons.	BT1	Remember
5.	Country site is not suitable for industries - Justify.	BT5	Evaluate
6.	Mention the various points to be considered while storing chemicals.	BT4	Analyze
7.	State the need for the decision of location of a plant.	BT2	Understand
8.	List any four methods of waste disposal.	BT1	Remember
9.	Location of a plant is of great concern to the management- Why?	BT6	Create
10.	Give any four prime factors to be considered in selecting a location for Explosives storage.	BT1	Remember
11.	What are the considerations made for land selection?	BT3	Apply
12.	Define serviceability.	BT5	Evaluate
13.	What are the considerations made for water source?	BT1	Remember
14.	Define Ideal Plant Location.	BT4	Analyze
15.	What are the considerations made for power source?	BT2	Understand

16.	Define plant capacity.	BT5	Evaluate
17	List the advantages and disadvantages of rural sites.	BT6	Create
18.	What is called as flexibility in plant location?	BT4	Analyze
19.	Mention the usage of LPG, LNG and CNG.	BT3	Apply
20.	Mention the disadvantages of urban sites.	BT1	Remember

PART - B(13 MARKS)			
Sl. No.	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Why plant location decisions are important to the organization?	BT3	Apply
2.	Explain in general the location of a factory.	BT2	Understand
3.	Describe the factors that influence location of the following storages: Liquefied Petroleum Gas, Liquefied Natural Gas and Compressed Natural Gas.	BT1	Remember
4.	Explain the methods to obtain flexibility.	BT6	Create
5.	List out the principal factors that influence the choice of plant location. Explain in detail.	BT4	Analyze
6.	Exemplify the factors to be considered in storage and handling of explosives.	BT5	Evaluate
7.	Summarize the factors to be considered while designing a fire hydrant system.	BT3	Apply
8.	Explain the various factors to be considered while designing an effluent treatment and disposal system.	BT4	Analyze
9.	Discuss the advantages and disadvantages of rural and urban plant sites.	BT2	Understand
10.	List out and discuss about the main factors for selection of specific equipment.	BT2	Understand
11.	Elucidate the factors to be considered for locating a hydro power plant.	BT1	Remember
12.	Explain the procedure necessary to be adopted for the safe location of chlorine and ammonia plant.	BT6	Create
13.	Explain the factors for consideration in space requirements.	BT4	Analyze
14.	Explain the procedure necessary to be adopted for the physical location of acetylene plant.	BT5	Evaluate

PART - C (15 MARKS)			
Sl. No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Explain in detail about the various factors that assure a safe layout of a construction site.	BT5	Evaluate
2.	Elucidate the factors to be considered for locating a cotton mill.	BT6	Create
3.	Explain the procedure necessary to be adopted for the physical location of Chlorine plant and Explosives plant.	BT4	Analyze
4.	Enumerate the various factors to be considered for locating a cement industry in Tamil Nadu.	BT6	Create

UNIT II :PLANT LAYOUT

UNIT-II - SYLLABUS

Safe layout, equipment layout, safety system, fire hydrant locations, fire service rooms, facilities for safe effluent disposal and treatment tanks, site considerations, approach roads, plant railway lines, security towers.

Safe layout for process industries, engineering industry, construction sites, pharmaceuticals, pesticides, fertilizers, refineries, food processing, nuclear power stations, thermal power stations, metal powders manufacturing, fireworks and match works.

PART - A (2 MARKS)

Sl.No	QUESTIONS	LEVEL	COMPETENCE
1.	Define the term plant layout.	BT2	Understand
2.	What are the uses of security towers?	BT4	Analyze
3.	State the importance of plant safety in a nuclear power plant.	BT5	Evaluate
4.	Describe the principle of plant layout.	BT6	Create
5.	List any four requirements for the safe layout for metal powder manufacturing industry.	BT5	Evaluate
6.	What do you know about equipment layout?	BT4	Analyze
7.	State the importance of plant safety in Fireworks industry.	BT2	Understand
8.	Explain the definition of plant layout.	BT1	Remember
9.	Discuss the main objectives of layout.	BT6	Create
10.	List down the facilities to be provided for the safe effluent disposal in process industries.	BT1	Remember
11.	Compare process layout and product layout.	BT5	Evaluate
12.	Explain the position of safety system in plant layout.	BT4	Analyze
13.	Describe the applications of process and product layouts.	BT2	Understand
14.	What are the symptoms of a bad layout?	BT1	Remember
15.	List out the tools and techniques of layout.	BT4	Analyze
16.	What is the need of fire service rooms?	BT1	Remember
17.	List the considerations to be made in selecting a site.	BT1	Remember
18.	What is group technology?	BT6	Create
19.	Brief about combinational layout.	BT5	Evaluate
20.	What is safe layout?	BT1	Remember

PART – B (13 - MARKS)			
Sl. No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Describe the procedure for safe layout of fireworks.	BT5	Create
2.	Illustrate the factors to be considered in process layout design with an example.	BT4	Evaluate
3.	List out the analytical tools of plant layout.	BT2	Analyze
4.	Draw the simple layout of a food processing unit and explain.	BT6	Apply
5.	Describe the procedure for safe layout of match works.	BT1	Create
6.	Explain the safe layout for refineries.	BT1	Evaluate
7.	Explicate the safe layout of nuclear power plant with a neat sketch.	BT3	Analyze
8.	Describe the facilities required for safe effluent disposal and treatment tanks.	BT5	Apply
9.	List down the considerations to be analyzed for a safe design of bulk chlorine storage facility.	BT4	Create
10.	Discuss about fire hydrants and fire service room in design of a plant layout.	BT1	Evaluate
11.	Describe the procedure for safe layout of construction site.	BT1	Analyze
12.	Explain the safe layout for a pharmaceutical industry.	BT2	Apply
13.	Draw the simple layout of a metal powder manufacturing unit and explain.	BT2	Create
14.	Explicate the safe layout of storing fertilizers and pesticides.	BT1	Evaluate

PART – C (15 MARKS)			
Sl. No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Draw the simple layout of a thermal power station and explain.	BT6	Create
2.	Describe the layout suitable for ship construction with schematic diagram and explain its merits and demerits.	BT5	Evaluate
3.	Analyze the various factors to be considered for selection of a site to start an industry with an example.	BT4	Analyze
4.	Outline the considerations to be followed for a safe design of a bulk Liquefied Petroleum Gas (LPG) storage facility.	BT3	Apply

UNIT III : WORKING CONDITIONS

UNIT-III -SYLLABUS

Principles of good ventilation, purpose, physiological and comfort level types, local and exhaust ventilation, hood and duct design, air conditioning, ventilation standards, application.

Purpose of lighting, types, advantages of good illumination, glare and its effect, lighting requirements for various work, standards- Housekeeping, principles of 5S.

PART - A (2 MARKS)

Sl. No	QUESTIONS	LEVEL	COMPETENCE
1.	Write down the principles of good ventilation.	BT2	Understand
2.	What are the functions of air conditioning?	BT4	Analyze
3.	What are the advantages of good illumination?	BT5	Evaluate
4.	Quality is improved by 5S – Justify.	BT6	Create
5.	Distinguish between exhaust and supply ventilation systems.	BT5	Evaluate
6.	Brief about conditioning of air.	BT4	Analyze
7.	Care must be taken to avoid glare – Justify.	BT2	Understand
8.	List any two ventilation standards.	BT1	Remember
9.	How glare can be prevented?	BT6	Create
10.	What are the effects of glare?	BT1	Remember
11.	“Need of air conditioning in India” – Comment?	BT5	Evaluate
12.	Applications of air conditioning?	BT4	Analyze
13.	Brief about local ventilation.	BT2	Understand
14.	What is the need of hood and duct?	BT1	Remember
15.	List some of the ventilation standards.	BT4	Analyze
16.	Discuss about illumination.	BT1	Remember
17.	Brief about exhaust ventilation.	BT1	Remember
18.	State the principles of 5S.	BT6	Create
19.	What is meant by 5S methodology?	BT5	Evaluate
20.	Why housekeeping is necessary any industry?	BT1	Remember

PART - B(13 MARKS)

Sl.No	QUESTIONS	LEVEL	COMPETENCE
1.	What are the advantages of local exhaust ventilation system?	BT5	Create

2.	Discuss the requirements of light for various works with suitable examples.	BT4	Evaluate
3.	State the advantages of good illumination.	BT2	Analyze
4.	Explain about the industrial lighting / illumination system in detail with compliance to Indian Standards.	BT6	Apply
5.	Compare and contrast dilution ventilation and Local exhaust ventilation.	BT1	Create
6.	Explain about the Industrial ventilation system in detail with an example.	BT1	Evaluate
7.	How will you apply the housekeeping principles for a typical Hospital environment?	BT3	Analyze
8.	With the help of neat sketch explain the working of an air conditioning system required for working environment.	BT5	Apply
9.	Explain in detail about ventilation standards.	BT4	Create
10.	Detail about the design of hood and duct.	BT1	Evaluate
11.	Discuss about the applications of air conditioning.	BT1	Analyze
12.	What are the effects of glare? Explain how to reduce it.	BT2	Apply
13.	Discuss the various housekeeping techniques with suitable illustrations.	BT2	Create
14.	Write the Principles of 5S in detail.	BT1	Evaluate

PART – C- (15 MARKS)			
Sl.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	State the need for lighting in Industries. Mention few sources of lighting and describe the effects of lighting.	BT6	Create
2.	Explicate the types of ventilation systems used in Industries with neat diagrams.	BT5	Evaluate
3.	How will you apply the housekeeping principles for a manufacturing industry?	BT4	Analyze
4.	Discuss the application of 5S in any industry.	BT3	Apply

UNIT IV : MANUAL MATERIAL HANDLING AND LIFTING TACKLES

UNIT-IV SYLLABUS

Preventing common injuries, lifting by hand, team lifting and carrying, handling specific shape machines and other heavy objects – accessories for manual handling, hand tools, jacks, hand trucks, dollies and wheel barrows – storage of specific materials - problems with hazardous materials, liquids, solids – storage and handling of cryogenic liquids - shipping and receiving, stock picking, dock boards, machine and tools, steel strapping and sacking, glass and nails, pitch and glue, boxes and cartons and car loading – personal protection – ergonomic considerations.

Fiber rope, types, strength and working load inspection, rope in use, rope in storage - wire rope, construction, design factors, deterioration causes, sheaves and drums, lubrication, overloading, rope fitting, inspection and replacement – slings, types, method of attachment, rated capacities, alloy chain slings, hooks and attachment, inspection.

PART - A (2 MARKS)

Sl.No	QUESTIONS	LEVEL	COMPETENCE
1.	Mention the accessories for manual handling.	BT2	Understand
2.	"Material handling is considered necessary evil"- Comment.	BT4	Analyze
3.	List out the objectives of material handling methods.	BT5	Evaluate
4.	Enlighten the accessories used for manual material handling.	BT6	Create
5.	Methods of shifting heavy objects.	BT5	Evaluate
6.	List down the accessories for manual material handling.	BT4	Analyze
7.	Write down the guidelines for safer lifting of materials.	BT2	Understand
8.	Define the term: Steel strapping and sacking.	BT1	Remember
9.	List the techniques to be used in case of team lifting and carrying of heavy object.	BT6	Create
10.	How hazardous materials can be transported?	BT1	Remember
11.	What are the uses of dollies and wheel barrows?	BT5	Evaluate
12.	Methods of storing and handling of cryogenic liquids.	BT4	Analyze
13.	Define shipping and receiving.	BT2	Understand
14.	How are boxes and cartons transported?	BT1	Remember
15.	How will you classify wire ropes according to lay of ropes?	BT4	Analyze
16.	List down the various considerations to be followed to remove a wire Rope from service.	BT1	Remember
17.	Define stock picking.	BT1	Remember
18.	Define steel strapping and sacking.	BT6	Create
19.	List the ergonomic conditions in manual handling.	BT5	Evaluate
20.	What are the factors to be considered while inspecting hooks?	BT1	Remember

PART – B-(13 MARKS)			
Sl. No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	List down the various precautions to be taken to prevent common injuries During manual material handling.	BT5	Create
2.	Name the important types of floor trucks. Briefly describe any two types.	BT4	Evaluate
3.	Mechanical handling improves productivity – Discuss.	BT2	Analyze
4.	Explain the storage and handling of cryogenic liquids.	BT6	Apply
5.	List out any five principles of material handling.	BT1	Create
6.	Brief about the accessories for manual handling.	BT1	Evaluate
7.	Explain the various precautions to be taken by the workers while moving materials manually.	BT3	Analyze
8.	Identify the precautions the workers should take to prevent accidents in storage of hazards material.	BT5	Apply
9.	Summarize in detail about lifting tackles.	BT4	Create
10.	What do you know about the inspection of wire ropes?	BT1	Evaluate
11.	Identify the factors to be followed to extend the life of usage of fiber rope.	BT1	Analyze
12.	Describe the construction of wire ropes, lubrication, and rope fitting.	BT2	Apply
13.	Write short notes on a) shipping and receiving b) stock picking c) dock Boards d) machine and tools e) steel strapping and sacking	BT2	Create
14.	Write a note about personal protection in manual material handling.	BT1	Evaluate

PART – C-(15 MARKS)			
Sl.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Describe load handling attachments to lift wooden logs.	BT6	Create
2.	List down the various precautions to be taken to prevent common injuries during manual material handling.	BT5	Evaluate
3.	Describe the construction and inspection of wire ropes.	BT4	Analyze
4.	List out the various ergonomic considerations to be followed in manual material handling.	BT3	Apply

UNIT V : MECHANICAL MATERIAL HANDLING

UNIT-V SYLLABUS

Hoisting apparatus, types - cranes, types, design and construction, guards and limit devices, signals, operating rules, maintenance safety rules, inspection and inspection checklist – conveyors, precautions, types, applications.

Powered industrial trucks, requirements, operating principles, operators selection and training and performance test, inspection and maintenance, electric trucks, gasoline operated trucks, LPG trucks – power elevators, types of drives, hoist way and machine room emergency procedure, requirements for the handicapped, types- Escalator, safety devices and brakes, moving walks – man lifts, construction, brakes, inspection.

PART - A (2 MARKS)

Sl.No	QUESTIONS	LEVEL	COMPETENCE
1.	Name any four types of hoisting apparatus.	BT2	Understand
2.	What is a hoist?	BT4	Analyze
3.	Explain the guards and limit devices provided in cranes.	BT5	Evaluate
4.	Name the two-classification group of mechanism for changing crane outreach.	BT6	Create
5.	Give the important applications of conveyors.	BT5	Evaluate
6.	Illustrate the limitations of a belt conveyor system.	BT4	Analyze
7.	What are limit devices?	BT2	Understand
8.	List down any four types of powered trucks and their uses.	BT1	Remember
9.	Mention the applications of conveyors.	BT6	Create
10.	List out the types of cranes.	BT1	Remember
11.	Point out some of the operating rules in material handling.	BT5	Evaluate
12.	What are the basic principles of material handling?	BT4	Analyze
13.	Give any three major divisions of mechanical handling equipment.	BT2	Understand
14.	Identify the name plate information on the LPG tank.	BT1	Remember
15.	Point out some of the maintenance safety rules in material handling.	BT4	Analyze
16.	Discuss the operating principles of powered industrial trucks.	BT1	Remember
17.	List down the requirements of powered industrial trucks.	BT1	Remember
18.	Compare electric truck with gasoline operated truck.	BT6	Create
19.	What is the use of escalator?	BT5	Evaluate
20.	What are the uses of LPG trucks?	BT1	Remember

PART - B(13 MARKS)			
Sl.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	List down and explain the categories and applications of cranes.	BT5	Create
2.	Explain the guards, limit devices and signals for the cranes.	BT4	Evaluate
3.	List down and explain the categories and applications of conveyors.	BT2	Analyze
4.	Illustrate any eight safety measures to be followed by a crane operator.	BT6	Apply
5.	Write short notes on inspection of powered industrial trucks.	BT1	Create
6.	List down any four advantages and limitations of operating forklifts and gantry cranes.	BT1	Evaluate
7.	Discuss the different types of hoisting apparatus.	BT3	Analyze
8.	Deliberate the safety rules to be followed while operating the cranes and hoists.	BT5	Apply
9.	Explain about the LPG trucks used in industries.	BT4	Create
10.	With a neat sketch, explain the working of power elevators.	BT1	Evaluate
11.	What are the advantages of material handling system?	BT1	Analyze
12.	Explain in detail about the requirements for the physically challenged person in power elevator.	BT2	Apply
13.	Describe the safety devices used in escalators.	BT2	Create
14.	List out various types of lifts with necessary safety precautions and maintenance.	BT1	Evaluate

PART – C-(15 MARKS)			
Sl.No	**QUESTIONS**	**LEVEL**	**COMPETENCE**
1.	Describe the operating principles and requirements of powered industrial trucks.	BT6	Create
2.	Explain the factors influencing the choice of material handling device.	BT5	Evaluate
3.	Brief about the operating principles, operators' selection with training and performance test, inspection, and maintenance of any two powered industrial trucks.	BT4	Analyze
4.	Explain in detail the power elevators and types of drives used in it.	BT3	Apply