Reg. No.																

Question Paper Code	14173

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

M.E. Industrial Safety Engineering

24PISEL101 - PLANT LAYOUT AND MATERIALS HANDLING

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following is not a primary factor influencing plant location? (a) Availability of labor (b) Aesthetic value of surroundings (c) Transportation facilities (d) Availability of raw materials	1	K1	CO1
2.	The best location for ammonia storage tanks is: (a) Underground, near drainage lines (b) Elevated platforms near administrative offices (c) Open, well-ventilated area isolated from main plant (d) Enclosed room with limited ventilation	1	K1	CO1
3.	The main objective of plant layout is: (a) To reduce the number of workers (b) To maximize safety, efficiency, and accessibility (c) To increase equipment size (d) To reduce maintenance requirements	1	K1	CO2
4.	Effluent treatment facilities should be located: (a) Near main roads (b) Downstream of plant drainage (c) Inside the production unit (d) Adjacent to warehouses	1	K1	CO2
5.	The physiological comfort zone for most workers is: (a) 10–15°C (b) 18–25°C (c) 28–35°C (d) 5–10°C	1	K1	CO3
6.	The minimum illumination for detailed mechanical work is approximately: (a) 50 lux (b) 100 lux (c) 300 lux (d) 1000 lux	1	K1	CO3
7.	The most common cause of manual handling injuries is: (a) Excessive illumination (b) Improper lifting posture (c) Machine failure (d) Poor ventilation	1	K1	CO4
8.	Ergonomic consideration in manual handling helps to: (a) Reduce worker comfort (b) Improve aesthetic appearance (c) Minimize strain and injury risk (d) Increase lifting frequency	1	K1	CO4
9.	The most common type of crane used in workshops is: (a) Tower crane (b) Jib crane (c) Overhead traveling crane (d) Mobile crane	1	K1	CO5
10.	Escalator safety is ensured by: (a) High speed motors (b) Emergency stop buttons and skirt guards (c) Removing safety devices (d) Manual operation	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Why is water availability crucial in selecting a plant location?	2	K2	CO1
12.	Differentiate between LPG and LNG in terms of storage safety requirements.	2	K2	CO1
13.	State two essential facilities that must be included in a plant layout for safety.	2	K2	CO2
14.	What is the role of fire service rooms in layout planning?	2	K2	CO2
15.	Define the physiological objectives of good ventilation.	2	K2	CO3
16.	List the five elements of the 5S principle.	2	K2	CO3
17.	List two causes of manual handling injuries.	2	K1	CO4

18.	Write two ergonomic principles in manual handling.	2	K1	CO4
19.	State the functions of guards and limit devices in cranes.	2	K2	CO5
20.	Mention two safety requirements for conveyors.	2	K2	CO5
21.	Mention any two types of elevator drives.	2	K1	CO6
22.	Define "idler roller" in a belt conveyor.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Discuss the key parameters and safety considerations in selecting a plant location for a chemical industry.	11	K3	CO1
		OR			
	b)	Describe the criteria for safe storage of flammable and explosive substances like LPG, CNG, and acetylene.	11	K3	CO1
24.	a)	Explain safe layout with a neat sketch for a thermal power station.	11	K3	CO2
		OR			
	b)	Compare the layout requirements of the food processing and pesticide industries.	11	K3	CO2
25.	a)	Describe the design considerations for lighting in manufacturing plants.	11	K3	CO3
		OR			
	b)	Discuss the importance of housekeeping and 5S in maintaining safety and productivity.	11	K3	CO3
26.	a)	Apply the inspection and maintenance protocol to evaluate the condition of a wire rope and suggest corrective actions based on observed deterioration.	11	K3	CO4
		OR			
	b)	Design a safe storage and handling system for cryogenic liquids in a laboratory, considering material properties, insulation, and personal protection measures.	11	K3	CO4
27.	a)	Design a preventive maintenance and inspection checklist for a chain-driven conveyor system used in a fertilizer production facility.	11	K3	CO5
		OR			
	b)	Prepare an inspection and maintenance checklist for powered material handling equipment.	11	K3	CO5
28.	a)	Apply ergonomic and safety principles to develop a step-by-step manual handling procedure for workers involved in lifting and stacking heavy metallic parts in a workshop. Include posture correction and teamwork aspects.	11	K3	CO6
		OR			
	b)	Discuss hoistway and machine room safety requirements, and describe emergency procedures.	11	K3	CO6