

A

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: U7506

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

Mechanical Engineering

21MEV506 – INDUSTRIAL LAYOUT DESIGN AND SAFETY

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Activity relationship chart (ARC) is a tool used to CO1- U
 - (a) Analyze employee travel patterns
 - (b) Visualize the relationships and dependencies between different tasks
 - (c) Track inventory levels in real-time
 - (d) Design the company website

2. Computer-aided facility layout (CAFL) software allows for CO1- U
 - (a) Managing employee social media accounts
 - (b) Testing and simulating different layout options
 - (c) Generating marketing materials for the company
 - (d) Scheduling employee vacation days

3. ADA (Americans with Disabilities Act) regulations in facility design ensure CO1- U
 - (a) Comfortable seating for all employees
 - (b) Accessibility for people with disabilities
 - (c) Proximity to break rooms for all employees
 - (d) Specific types of office equipment

4. OSHA regulations in facility design are concerned with CO1- U
- (a) Optimizing existing layouts
 - (b) Determining the initial placement of departments
 - (c) Fine-tuning the arrangement of equipment
 - (d) Assigning tasks to specific workers
5. What is the primary goal of facility layout design CO1- U
- (a) Minimizing the number of departments
 - (b) Maximizing material flow distance
 - (c) Minimizing overall costs
 - (d) Maximizing production time
6. What is the primary purpose of warehouse functions CO1- U
- (a) Enhance production scheduling
 - (b) Store and manage inventory efficiently
 - (c) Reduce transportation distances
 - (d) Increase material flow time
7. What does the term "hazardous substance" refer to in the context of workplace safety CO2 -U
- (a) Any substance that causes burns
 - (b) Any substance that can pose a risk to health or safety
 - (c) Any material used for construction
 - (d) Non- flammable substance
8. Which of the following is essential for safety management in industries handling hazardous substances CO2 -U
- (a) Proper labeling of chemicals
 - (b) Overstaffing of the workplace
 - (c) Increasing production targets
 - (d) Employee overtime
9. What is a key safety feature to prevent tractor rollovers CO2- U
- (a) Anti-lock braking system
 - (b) Roll-Over Protective Structure (ROPS)
 - (c) Seat belts
 - (d) Automatic steering system
10. Hydrocarbons are typically stored in which type of container CO2- U
- (a) Plastic bags
 - (b) Open containers
 - (c) Sealed metal drums
 - (d) Wooden crates

PART – B (5 x 2= 10 Marks)

11. Explain the importance of product analysis in facility layout planning. CO1- U
12. What are some factors to consider when designing a layout for a warehouse or distribution center? CO1- U
13. Describe the Quadratic Assignment Problem (QAP) in facility layout. CO1- U
14. What are the key elements of safety programming in industries. CO2- U
15. What safety precautions should be taken when storing compressed gas cylinders. CO2- U

PART – C (5 x 16= 80Marks)

16. (a) Explain briefly about Product Analysis. CO1- U (16)
Or
(b) Explain the process of personnel requirement analysis in industrial facility layout. Discuss its importance in the overall layout design process. CO1- U (16)
17. (a) Suggest safety management practices to prevent trip, slip, and fall hazards in industrial facilities. CO4-App (16)
Or
(b) Apply the construction and improvement algorithm approach to develop an efficient layout for a production system. CO3-App (16)
18. (a) Construct a layout problem model for integrating both storage and manufacturing departments in a facility. CO3- App (16)
Or
(b) Develop a warehouse design model that balances storage density with accessibility for order picking. CO3- App (16)
19. (a) Implement control measures to reduce exposure to toxic fumes in paint shops. CO4- App (16)
Or
(b) Suggest practical safety management arrangements for night-shift operations in manufacturing plants. CO4- App (16)
20. (a) Apply safe material-handling principles in facility layout planning to minimize risks of slips and falls. CO3- App (16)
Or
(b) Describe the role of safety arrangements in ensuring the safe handling and storage of compressed gas cylinders. CO3- App (16)

