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Question Paper Code: U9774S

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Open elective

21UME974 – BASICS OF INDUSTRIAL LAYOUT DESIGN AND SAFETY

(Common to All Engineering branches)

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. What is the primary objective of industrial facility layout planning CO1 U
 - (a) Optimizing worker comfort
 - (b) Minimizing production costs
 - (c) Maximizing aesthetic appeal
 - (d) Increasing energy consumption

2. The engineering design problem approach involves considering which of the following factors CO1 U
 - (a) Cost, safety, and functionality
 - (b) Brand recognition and marketing strategy
 - (c) Employee morale and break room location
 - (d) Production speed only

3. Systematic Layout Planning (SLP) is a step-by-step approach to facility layout that emphasizes CO1 U
 - (a) Aesthetics and employee comfort
 - (b) Efficiency and minimizing material handling
 - (c) Cost of office furniture
 - (d) Employee social interaction

4. Special considerations in office layout might include CO1 U
- (a) Optimizing space for heavy machinery
 - (b) Accommodating natural light and noise control
 - (c) Proximity to break rooms only
 - (d) Focus solely on maximizing employee density
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. Which of the following is a characteristic of the Single-Row Layout Problem CO1 U
- (a) Departments arranged in multiple rows
 - (b) Departments arranged in a linear sequence
 - (c) Departments have unequal areas
 - (d) Departments are organized in a circular pattern
7. What is the primary focus of the Indian Factories Act, 1948 CO1 U
- (a) Increasing production
 - (b) Ensuring safety, health, and welfare of workers
 - (c) Enhancing factory infrastructure
 - (d) Regulating exports
8. What does the term "hazardous substance" refer to in the context of workplace safety CO1 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
9. What is the primary cause of trips, slips, and falls in the workplace CO1 U
- (a) Wet floors
 - (b) Poor lighting
 - (c) Uneven surfaces
 - (d) Lack of signage

10. What is the primary safety measure to prevent static electricity hazards CO1 U
- (a) Wearing rubber-soled shoes (b) Using anti-static mats
- (c) Grounding and bonding (d) Increasing humidity

PART – B (5 x 2= 10Marks)

11. Define Industrial Facility Layout and explain its significance in manufacturing CO1 U
12. Describe the limitations of using "rule of thumb" approaches in facility layout planning. CO1 U
13. What are the main objectives of facility layout design CO1 U
14. What are the key elements of safety programming in industries CO1 U
15. Describe two methods for preventing electrocution in the workplace CO1 U

PART – C (5 x 16= 80Marks)

16. (a) Discuss the different types of layout problems commonly encountered in industrial facility design. Illustrate each type with relevant examples. CO1 U (16)
- Or
- (b) Explain briefly about Product Analysis CO1 U (16)
17. (a) Utilize engineering design approaches to construct a facility layout that complies with OSHA and ADA regulations, ensuring safety and accessibility. CO2 App (16)
- Or
- (b) Apply systematic layout planning principles to develop an office layout that meets ergonomic, safety, and productivity requirements. CO2 App (16)
18. (a) Construct a single-row layout model for a production line with departments of unequal areas. Make use of optimization algorithms to enhance workflow. CO3 App (16)
- Or
- (b) Construct a warehouse operation plan by utilizing models that balance material handling efficiency with storage capacity optimization. CO3 App (16)

19. (a) Design a safety management plan for a medium-scale manufacturing unit. CO4 App (16)
- Or
- (b) Identify and propose safety measures and performance indicators that would ensure both compliance and continuous improvement in safety standards. CO4 App (16)
20. (a) Develop a comprehensive plan to mitigate the risks associated with trips, slips, and falls in a manufacturing plant. CO5 App (16)
- Or
- (b) Analyze the potential risks involved in forklift operation and propose control measures, including training, equipment maintenance, and safety protocols. CO5 App (16)