

Dec.-23-0556

ME-708 (Material Handling and Plant Layout)

B.Tech. 7th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt Five questions in all, selecting one question each from sections A, B, C and D. Section E is compulsory. Assume missing data suitably, if any.

SECTION - A

1. (a) What do you mean by good and bad plant layout? What are the symptoms of bad plant layout? Explain the factors which govern plant layout economics. (5)
- (b) What costs should be considered in a location decision? What other factors should be considered? Williams-Practar considered five alternative locations for a new warehouse for their music distribution business. After many discussions they compiled a list of important factors, their maximum scores, and actual scores for each site. What is the relative importance of each factor? Which site would you recommend? (5)

Factor	Maximum score	A	B	C	D	E
Climate	10	8	6	9	7	5
Infrastructure	20	12	16	15	8	13
Accessibility	10	6	8	7	9	9
Construction cost	5	3	1	4	2	1
Community attitude	10	6	8	7	4	8
Government views	5	2	2	3	4	3
Closeness to suppliers	15	10	10	13	13	10
Closeness to customers	20	12	10	15	17	10
Availability of workforce	5	1	2	4	5	3

2. (a) Explain the general factors required for location of plant in case of (i) service organizations (ii) manufacturing organizations. (5)
- (b) What is group technology? State its relevance, application and advantages. (5)

SECTION - B

3. (a) Explain various tools cum techniques (i) operation process chart (ii) flow process chart (iii) string diagram with necessary diagrams. (5)
- (b) Explain various factors that affect the plant layout. Also, explain the Apple's plant layout procedure. (5)
4. (a) What are the objectives of line balancing? What are different methods of line balancing? Provide comparison among them. (5)
- (b) Develop a solution for the following line balancing problem, allowing a cycle time of 5 minutes, i. Draw the precedence diagram for the set of tasks, ii. Calculate the theoretical minimum number of workstations, iii. Balance this line using the longest task time heuristic, iv. What tasks are assigned to which stations? (5)

Work Task	Task Time (seconds)	Task Predecessors)
A	70	-
B	60	A
C	120	B
D	60	-
E	240	C,D
F	100	A
G	190	E, F

SECTION - C

5. (a) Define material handling. What are basic features of material handling? Explain the principles of material handling in detail. (5)
- (b) What are various (i) Fixed path material handling equipments, and (ii) Variable path material handling equipments? Provide neat sketches. (5)
6. (a) Discuss in detail about the selection and maintenance of material handling equipments. (5)
- (b) Explain the importance of cost analysis of material handling systems. How is it carried out? (5)

SECTION - D

7. (a) What factors will be considered for selection of site for service organizations, say software company? Explain. How they will be different from manufacturing company? (5)
- (b) State characteristics of material handling systems such as conveyors, cranes and hoists. Also provide neat sketches. (5)
8. (a) What is the difference between assembly line balancing and fabrication line balancing? How both are done? Explain the procedure. (5)
- (b) Explain procedure for travel charting with help of example. (5)

SECTION - E (Compulsory)

9. (i) What do you mean by line balancing? State some heuristic methods.

- (ii) Explain flow process chart with example.
- (iii) How material handling is related to plant layout ?
- (iv) Expand abbreviations ADLAP, CORELAP and CRAFT.
- (v) Distinguish between rural versus urban plant sites. What is analysis of alternatives? How is it done? (5×4=20)