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B.E/B.Tech (FULL-TIME) DEGREE END SEMESTER EXAMINATIONS – APRIL / MAY 2019

Industrial Engineering

III SEMESTER

(R2012)

IE 8302 – FACILITY LAYOUT AND MATERIAL HANDLING

Time: Three hours

Max. Marks: 100

Answer ALL questions

PART – A (10 X 2 = 20 Marks)

1. List the need for plant location
2. Write short note on Factor Rating Method for Location Planning
3. List the steps in Systematic Layout Planning (SLP)
4. State the Objectives of a good facility layout
5. Define Group Technology.
6. What are the inputs for CRAFT?
7. Define Line balancing
8. State the objectives of Line balancing
9. State the Relationship between layout and Material handling
10. List the functions of Packaging.

**Part-B (5 X 16 = 80 Marks)**

11. A Particular Model of a car is to be assembled on a conveyor belt. Five hundred cars are required per day. Production time per day is 420 minutes, and the assembly steps and times for the wagon are given below. Find the balanced line that minimizes the number of workstations, subject to cycle time and precedence constraints(Choose any method of your choice).

Task	Task time (in seconds)	Description	Tasks that must precede
A	45	Position rear axle support and hand fasten	-
B	11	Four screws to nuts	A
C	9	Insert rear axle	B
D	50	Tighten rear axle support screws to nuts	-
E	15	Position front axle assembly and hand	D
F	12	Fasten with four screws to nuts	C
G	12	Tighten front axle assembly screws	C
H	12	Position rear wheel 1 and fasten hubcap	E
I	12	Position rear wheel 2 and fasten hubcap	E
J	8	Position front wheel 1 and fasten hubcap	F, G, H, I
K	9	Position front wheel 2 and fasten hubcap	J

12a. The new Health-care facility is targeted to serve seven census tracts in Delhi. The table given below shows the coordinates for the centre of each census tract, along with the projected populations, measured in thousands. Customers will travel from the seven census tract centres to the new facility when they need health-care. Two locations being considered for the new facility are at (5.5, 4.5) and (7, 2), which are the centers of census tracts C and F. Details of seven census tract centers, coordinate distances along with the population for each centre are given below. Find the target area's centre of gravity for the Health-care medical facility.

Sl. No.	Census tract	(x, y)	Population (l)
1	A	(2.5, 4.5)	2
2	B	(2.5, 2.5)	5
3	C	(5.5, 4.5)	10
4	D	(5, 2)	7
5	E	(8, 5)	10
6	F	(7, 2)	20
7	G	(9, 2.5)	14

(OR)

12b. Potential locations X, Y and Z have the cost structures shown below. The ABC company has a demand of 1,30,000 units of a new product. Three potential locations X, Y and Z having following cost structures shown are available. Select which location is to be selected and also identify the volume ranges where each location is suited?

	Location X	Location Y	Location Z
Fixed Costs	Rs. 150,000	Rs. 350,000	Rs. 950,000
Variable Costs	Rs. 10	Rs. 8	Rs. 6

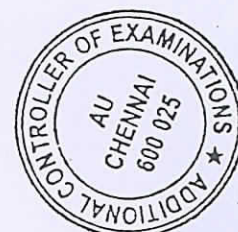
13a. List and explain various factors influencing plant layout decisions.

(OR)

13b. List the Advantages and Limitations of different types of Plant Layout .

14a. Explain in detail about the Steps involved in Automated Layout Design Program (ALDEP).

(OR)



14b. Consider Machine- component incidence matrix with 5 machines and 5 components given below and obtain the Final machine cell using Rank Order clustering.

		Component				
		1	2	3	4	5
Machine	1	0	1	1	0	1
	2	1	0	0	1	1
	3	0	0	1	0	0
	4	1	0	0	1	0
	5	1	0	0	0	1

15a. Explain about the different Material Handling Principles .

(OR)

15b. List and explain about the factors affecting the Selection of Material Handling equipment .

