Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2724601 **Date: 28/05/2015**

Subject Name: Faculty planning and design

Time: 2:30 PM – 5:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	(a)	Describe the activities that would be involved in the following: a) Facility location and b) Facility design	07
	(b)	Develop a list of strategic issue that must be addressed in performing facilities planning for a) An airport and b) Grocery store chain	07
Q.2	(a)	Discuss the merits and demerits of fixed position, process and product layouts. Name some of the industries where they are used.	07
	(b)	Contrast and Compare the plant layout procedure proposed by Apple and Muther.	07
		OR	
	(b)	"For a good plant layout detailed analysis of material flow is essential". Discuss.	07
Q.3	(a)	An assembly operation consists of 10 tasks which must be completed in order from task 1 to 10. The respective task completion times in minutes are as follows: 0.3, 0.5, 0.3, 0.2, 0.2, 0.1, 0.4, 0.3, 0.8 and 0.2. Assume a 40 hour work week, a 92 % line efficiency and a desired production rate of 1840 units per week. a) What is the desired cycle time for the assembly line? b) How many work stations will be required and what tasks are to be performed at each station? c) Find out line efficiency and balance delay.	07
	(b)	Explain the following in brief: 1. Lockers and washrooms 2. Food services	07
		OR	
Q.3	(a)	Distinguish between receiving, storage, warehousing and shipping. Why these departments must be planned together.	07
	(b)	What are some major considerations in the layout of a tool crib?	07
Q.4	(a)	Explain any four principles of material handling. How material handling affects plant layout.	07
	(b)	On what basis the material handling equipment's are classified? Explain.	07
		OR	

Q.4 **(a)** What are conveyors? Explain how the conveyor can set the pace of production? **07**

(b) Mention three handling devices that combine horizontal motion with vertical motion. **07**

Q.5 **(a)** Suppose the cost computed by CRAFT is designated by K. Suppose that four departments (labeled A, B, C & D) are given for a layout problem. Each department is assumed to be of equal area i.e. unit square. The unit cost used in computing K is assumed to be equal to 1 for all department pairs. (That is $C_{ij} = 1.0$ for all i, j) The flow between the above departments is given as follows. Compute the values of K for the layout 'a' and 'b'. **07**

	A	B	C	D
A	-	10	10	0
B		-	0	4
C			-	4
D				-

a)

A	C
B	D

b)

A	B	
	C	D

(b) Write a note on activity relation chart with suitable diagram. **07**

OR

Q.5 **(a)** Apply the rank order clustering technique to the part-machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified by numerically. **07**

	Parts				
Machine	A	B	C	D	E
1	1				
2		1			1
3	1			1	
4		1	1		
5				1	

(b) Consider the following data on locating a new facility which has to serve 5 different existing facilities. The coordinates of the existing facilities are (30, 20), (40, 50), (30, 30), (15, 30) and (20, 40). The number of tons of material transported per year from the new facility to each of the existing facilities is given below. Find the optimal X and Y coordinates of the new facility. **07**

	Existing facility				
	1	2	3	4	5
New Facility	1000	980	1500	2000	1750

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