Name:

Enrolment No:

UPES
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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Facility planning and Material handling **Semester: VII**
Program: B Tech ADE **Time 03 hrs.**
Course Code: IPEG 411 **Max. Marks: 100**
No of pages : 3
Instructions: Any assumptions made should be clear and relevant. Draw the sketches where ever necessary.

SECTION A

S. No.		Marks	CO
Q 1	How the belt conveyors are classified?	**5**	**CO1**
Q 2	State the objectives of a good plant layout.	**5**	**CO 2**
Q 3	Draw the outline sketch of process layout.	**5**	**CO 2**
Q 4	Identify the various reasons for the requirement of modification of plant layout.	**5**	**CO 3**
	SECTION B		
Q 5	Describe and determine the effect of product, process, and schedule design parameters on plant layout and materials handling systems design.	**10**	**CO4**
Q 6	Explain how the global/foreign location requirement can be validated/justified. Discuss all relevant criteria.	**10**	**CO 4**
Q 7	Identify characteristic features of product and process layouts and their needs in terms of materials handling systems.	**10**	**CO 4**
Q 8	A company wishes to build a new plant in a country location. The following data are given. Part no Volume (Pieces/year) Bulk Factor (Pieces/ load) Sequence of operations 1 6000 30 A, B, C, D, E 2 10000 200 A, C, B, D, E 3 600 30 A, B, E 4 3000 00 A, C, D, E Determine the optimum arrangement of the departments. Each department requires equal area and diagonal aisles are prohibited. The measure of effectiveness should be the total distance travelled. OR	**10**	**CO 4**

	Discuss the main features of four wheeled powered drives such as fork lift, trucks used during material handling with the aid of sketches		
	SECTION C		
Q 9	A local manufacturing firm has recently completed construction of a new plant to house 4 departments: A, B, C, and D. The plant is $100m^2$ x 50 m^2. The plant manager has chosen an initial layout of the 4 departments. This layout is given in Figure 2-3. From the figure we see that department A requires 1800 m^2, department B 1200 m^2, department C 800 m^2 , and department D 1200m^2. (i) Initial plant layout A (Area = 1800 $m^{2)}$ | B (Area = 1200 $m^{2)}$ C (Area = 800 $m^{2)}$ | D (Area = 1200 $m^{2)}$ (ii) Material flows between all departments. Material flow | A | B | C | D A | 0 | 2 | 7 | 4 B | 3 | 0 | 5 | 5 C | 6 | 7 | 0 | 3 D | 8 | 2 | 3 | 0 (iii) Centroid locations Centroid: X, Y A | 30 | 35 B | 80 | 35 C | 20 | 10 D | 70 | 10 (iv) Distance matrix Distance | A | B | C | D A | 0 | 50 | 35 | 65 B | 50 | 0 | 85 | 35 C | 35 | 85 | 0 | 50 D | 65 | 35 | 50 | 0	**20**	**CO 4**

Q 10

The distance between two departments is to be assumed as the rectilinear distance between the centroid locations of the corresponding departments. Try to improve the initial layout by applying the CRAFT algorithm (pairwise exchanges).

(a) Develop a layout for the following problem. Layout & area requirements are shown in Table (Use ALDEP method)

Department	Area (sq. feet)	No of unit squares
1	1200	30
2	800	20
3	600	15
4	1200	30
5	800	20
6	1200	30
7	1200	30
8	7000	175

Assume One square in the layout to be equal 40 sq. ft.

No. of unit squares for dept = department area in sq. ft/area per square. Let the size of layout be 15x12, & the sweep width be 2 . (15 marks)

(b) Identify difficulties encountered during material handling system (5 marks)

20

CO 5

OR

(a) What is BEP? What is its significance? Explain how to achieve breakeven in newly developed industries with example (12 marks)

(b) 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 . Also identify the volume ranges where each location is suited? (8 marks)

CO 5

	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