

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B tech ADE

Semester : VII

Course Name : Facility planning and material handling

Time : 03 hrs.

Course Code : IPEG 411

Max. Marks: 100

Nos. of page(s) : 4

Instructions: Assume the suitable missing data.

SECTION A

S. No.		Marks	CO
Q 1	“Zero handling is the best handling” Criticize statement	4	CO 2
Q 2	“Material handling activity is non-productive activity” Criticize the statement	4	CO 3
Q 3	Discuss use of cubic space principle of material handling.	4	CO 2
Q 4	Highlight the concept of cost effective material handling with respect to breakeven point	4	CO 3
Q 5	Differentiate between single story and multi storied buildings on the basis of facility planning and arrangement of material handling system to be implemented.	4	CO 1

SECTION B

Q 6	Classify material handling equipment based on by their design features and their working area. Explain each of them	10	CO4
Q 7	Explain various principles of material handling mentioning the activities of their implementation	10	CO 2
Q 8	Prepare a checklist of a facility plan of an automotive industry	10	CO 4
Q 9	Suppose that four machines, 1, 2, 3, and 4 have been identified as belonging in a machine cell. An analysis of 50 parts processed on these machines has been summarized in the From-To chart presented below. Additional information is that 50 parts enter the machine grouping at machine 3, 20 parts leave after processing at machine 1, and 30 parts leave after machine 4. Determine a logical machine arrangement using Hollier method.	10	CO 5

From-To Chart

		To:	1	2	3	4
From:	1		0	5	0	25
	2		30	0	0	15
	3		10	40	0	0
	4		10	0	0	0

OR

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 identify the volume ranges where each location is suited?

	Location X	Location Y	Location Z
Fixed Costs	Rs. 250,000	Rs. 450,000	Rs. 950,000
Variable Costs	Rs. 12	Rs. 10	Rs. 8

SECTION-C

Q 10

To illustrate the differences in fixed-position layout, job shop production, cellular manufacturing systems and flow shop production consider a situation in which four parts (A, B,C, D) are to be produced and assembled into a single product. The processing sequence for part A is saw, turning, milling, and drilling ; for part B it is saw, milling, drilling, and painting; for part C the processing Sequence is grinding, milling, drilling, and painting and for part D the sequence is welding, grinding, turning, and drilling. All parts go to a central assembly department. The following table contains the proportional Capacity requirement of each part on each machine relative to the capacity availability of the machine in one period.

parts	Equipment requirements						
	weldi ng	grinding	saw	turni ng	milli ng	drilli ng	painting
A	-	-	0.5	0.5	0.3	0.2	-
B	-	-	0.4	-	0.5	0.3	0.2
C	-	0.4	-	-	0.3	0.5	0.3
d	0.3	0.5	-	0.3	-	0.2	-

Based on the given capacity requirements, the minimum equipments needed is:

20

CO5

1 welding machine, 1 grinding machine, 1 saw machine, 1 turning machine, 2 milling machines ($0.3+0.5+0.3 > 1$), 2 drilling machines and 1 painting machine.

Q 11

A local manufacturing firm has recently completed construction of a new plant to house 4 departments: A, B, C, and D. The plant is $100\text{m}^2 \times 50\text{m}^2$. 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 1800m^2 , department B 1200m^2 , department C 800m^2 , and department D 1200m^2 .

(i) Initial plant layout

A (Area = 1800m^2)	B (Area = 1200m^2)
C (Area = 800m^2)	D (Area = 1200m^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 5

	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).		
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OR			
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	<p>(a) Explain different criteria kept in mind while designing and locating a new plant.</p> <p>(b) From the following data, select the most advantageous location for setting a plant for making bearings.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 15%; text-align: center;">Site X</th> <th style="width: 15%; text-align: center;">Site Y</th> <th style="width: 15%; text-align: center;">Site Z</th> <th style="width: 15%;"></th> </tr> <tr> <td></td> <td style="text-align: center;">Rs.</td> <td style="text-align: center;">Rs.</td> <td style="text-align: center;">Rs.</td> <td></td> </tr> </thead> <tbody> <tr> <td>(i) Total initial investment</td> <td style="text-align: right;">2,00,000</td> <td style="text-align: right;">2,00,000</td> <td style="text-align: right;">2,00,000</td> <td></td> </tr> <tr> <td>(ii) Total expected sales</td> <td style="text-align: right;">2,50,000</td> <td style="text-align: right;">3,00,000</td> <td style="text-align: right;">2,50,000</td> <td></td> </tr> <tr> <td>(iii) marketing and distribution expenses</td> <td style="text-align: right;">75000</td> <td style="text-align: right;">40,000</td> <td style="text-align: right;">40,000</td> <td></td> </tr> <tr> <td>(iv) Raw material expenses</td> <td style="text-align: right;">70,000</td> <td style="text-align: right;">80,000</td> <td style="text-align: right;">90,000</td> <td></td> </tr> <tr> <td>(v) Power and water supply expenses</td> <td style="text-align: right;">40,000</td> <td style="text-align: right;">30,000</td> <td style="text-align: right;">20,000</td> <td></td> </tr> <tr> <td>(vi) Wages and salaries</td> <td style="text-align: right;">20,000</td> <td style="text-align: right;">25,000</td> <td style="text-align: right;">20,000</td> <td></td> </tr> <tr> <td>(vii) Other expenses</td> <td style="text-align: right;">25,000</td> <td style="text-align: right;">40,000</td> <td style="text-align: right;">30,000</td> <td style="text-align: center;">(10+10)</td> </tr> <tr> <td>(viii) Community attitude</td> <td style="text-align: center;">not interested</td> <td style="text-align: center;">not interested</td> <td style="text-align: center;">need business</td> <td style="text-align: center;">CO 5</td> </tr> <tr> <td>(ix) Employee housing facilities</td> <td style="text-align: center;">Poor</td> <td style="text-align: center;">Excellent</td> <td style="text-align: center;">Good</td> <td></td> </tr> </tbody> </table>		Site X	Site Y	Site Z			Rs.	Rs.	Rs.		(i) Total initial investment	2,00,000	2,00,000	2,00,000		(ii) Total expected sales	2,50,000	3,00,000	2,50,000		(iii) marketing and distribution expenses	75000	40,000	40,000		(iv) Raw material expenses	70,000	80,000	90,000		(v) Power and water supply expenses	40,000	30,000	20,000		(vi) Wages and salaries	20,000	25,000	20,000		(vii) Other expenses	25,000	40,000	30,000	(10+10)	(viii) Community attitude	not interested	not interested	need business	CO 5	(ix) Employee housing facilities	Poor	Excellent	Good			
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