

All questions are compulsory. Each question carries 6 marks.

Question 1:

The annual sales of truck tyres manufactured by a company are as follows

Year	(X)	2002	2003	2004	2005	2006
Sales ('000 units)	(Y)	53	64	86	54	83

Fit a linear trend equation to the sales figures and estimate the sales for 2007, 2008, 2009.

Question 2:

An investigation into the demand for coolers in 5 towns has resulted in the following data:

Population of the town (in lakhs)	X :	5	7	8	11	14
No. of coolers demanded	Y :	45	65	55	75	95

Fit a linear regression of Y on X and estimate the demand for coolers for a town with a population of 25 lakhs.

Question 3:

Potential locations A, B and C have the cost structures shown for producing an article. Find the most economical location for an expected volume of 2,000 units/year. Also determine the range of annual production for which each of the location is most economical.

Location	Fixed Cost/year (Rs.)	Variable Cost per unit (Rs.)
A	25,000	50
B	50,000	25
C	80,000	15

(Show all 3 analysis, Break even, graph and tabular).

Question 4:

A defence contractor is evaluating its machine shops current process layout. The figure below shows the current layout and the table shows the trip matrix for the facility. Health and safety regulations require departments E and F to remain at their current positions.

E	C	F
A	B	D

Current Layout

From / To	A	B	C	D	E	F
A		8	3		9	5
B		-		3		
C			-		8	9
D				-		3
E					-	3
F						-

Can layout be improved? Also evaluate using load distance (ld) score.

Question 5:

Mr. X, the factory Manager of S.K. Industries, is considering an interchange of departments 1 and 6 in the present layout. The present layout and the interdepartmental materials handling frequencies are furnished below [All the departments are of the same size and configuration in the following matrix, respectively.

1	3	5
2	4	6

Present Layout

Weekly frequencies of interdepartmental Material handling

From / To	1	2	3	4	5	6
1	—	0	90	160	50	6
2	—	—	70	0	100	130
3	—	—	—	20	0	0
4	—	—	—	—	180	10
5	—	—	—	—	—	40

The per unit length inter departmental cost of materials of materials handling are equal. What is the effect of the interchange of the departments 1 and 6 in the layout?