Uva Wellassa University, Sri Lanka
End Semester Examination – July 2010
SCT 403-1 –Industrial Management

Time: One (01) hour

Total four (04) questions.
Answer three (03) questions only.
Each question carries equal marks.

01)

Assume you are an industrial manger of a company that manufactures natural rubber products for export market. The company is looking to expand its business in order to meet the customer demand. Feasibility studies have been done on selected locations in Rathnapura, Katunayaka and Hambanthota in order to build up its latest manufacturing facility. The manufacturing process is highly labour intensive and it is expected to fulfill 80% of its raw material requirement from natural rubber in Sri Lanka.

I. Express 5 factors that need to consider when selecting the optimum location for a plant.
(20 marks)

II. What are the three main aspects of plant location problem? Give an example of a situation where one aspect is dominant over others.
(30 marks)

III. Using your understanding on plant location problem discuss the advantages and disadvantages of above three aspects considering the factors given in section I. Clearly state the assumptions you made.
(50 marks)

02)

I. List out five factors that affect plant layout design.
(20marks)

II.

a) State the four main types of plant layout designs.
b) What is the best layout for a movable crane manufacturing plant? Discuss the advantages and disadvantages of the layout type you are proposing.
(30 marks)

III. An initial layout of a sport medicine clinic (total space 3750 sq.ft.) is given below. Using information like space needed, from-to matrix and REL charts, propose two new layouts and construct a load distance table for each layout. By using the total load distance score, decide the best layout.

A Radiology 400 sq. ft.	B Laboratory 300 sq. ft.	C Lobby & Waiting 300 sq. ft.
D Examining Rooms 800 sq. ft.	E Surgery & Recovery 900 sq. ft.	F Physical Therapy 1050 sq. ft.

TABLE 10-2 From-To Matrix for Recovery First

Department	Trips between Departments A	B	C	D	E	F
A. Radiology	–	–	–	45	12	25
B. Laboratory		–	–	45	14	5
C. Lobby and waiting area			–	50	20	43
D. Examining rooms				–	–	12
E. Surgery and recovery						–
F. Physical therapy						–

TABLE 10-3 REL Chart for Recovery First

Department	Closeness Rating between Departments A	B	C	D	E	F
A. Radiology	–	U	U	O	A(2)	O
B. Laboratory		–	U	O	I(3)	U
C. Lobby and waiting area			–	E(1)	X(4)	I(1)
D. Examining rooms				–	O	I(1)
E. Surgery and recovery						O
F. Physical therapy						–

Explanation of Rating Codes			
Rating	Definition	Code	Meaning
A	Absolutely necessary	1	Patient convenience
E	Especially important	2	Sharing of medical staff
I	Important	3	Access to equipment
O	Ordinary closeness	4	Patient privacy
U	Unimportant		
X	Undesirable		

List out few practical considerations when selecting the location of departments/sections. (50 marks)

03)

I. Give three types of system failures (out of five types).

(20 marks)

II. State three main ways of measuring failures. Give the definition of one. You may use an equation or statement.

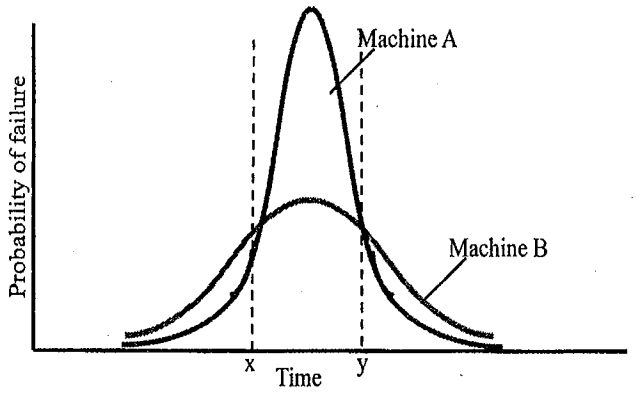
(30 marks)

III.

a) What is meant by MTTR and MTBF?

b) Given below is a failure probability distribution of two machines A and B. Using your knowledge in failure prevention and recovery, discuss the benefits of preventive maintenance programme for each machines A and B. Hint: preventive maintenance is a costly measure.

(50 marks)



04)

I. What are the objectives of Total Productive Maintenance (TPM).

(20 marks)

II. List the eight pillar structure of TPM.

(30 marks)

III.

a) Give eight major equipment losses regarding the Overall Equipment Effectiveness of a plant.

b) Given below is the loss and operation data of a soap manufacturing plant for a day. Calculate the Overall Equipment Effectiveness (OEE) of the plant.

Component	Unit	Quantity
Operating time	min	420
Failure	min	25
Time taken for a Changeover	min/time	15
No. of Changeovers per day	no.s	2
Change of Tool	min	10
Standard Cycle time	min/time	0.4
Actual Cycle time	min/time	0.6
Manufacturing quantity	number/day	640
Defects numbers	number/day	13
Scheduled Downtime	min	20

(50 marks)