MBS / Second Semester / MSC 516 : Production and Operations Management

Candidates are required to answer all the questions in their own words as far as practicable. Figures in the brackets indicate full marks.

Group " A "
Extended Problem Analysis Questions

Attempt all Questions :   **[1**
$\times 30 = 30 ¿$

1(a) Read the following case analytically and answer the following questions.   (15)

ABC Ltd. is the country's largest manufacturer of spun yarn with well-established market. ABC Ltd. has good reputation for quality and service. Their marketing department identified that the potential for global market is expanding rapidly and hence the company undertook exercise for expansion of the capacity for export market. The company formed team of Marketing and Materials department to study the global logistics possibilities. After extensive study, the team came up with a report on global logistics and submitted that global logistics is essentially same as domestic due to following similarities:

• The conceptual logistics framework of linking supply sources, plants, warehouses and customers is the same.
• Both systems involve managing the movement and storage of products.
• Information is critical to effective provision of customer service, management of inventory, vendor product and cost control.
 • The functional processes of inventory management, warehousing, order processing, carrier selection, procurement, and vendor payment are required for both.
 • Economic and safety regulations exist for transportation.

 The company had very economical and reliable transportation system in existence. For exports as well they decided to evaluate capabilities of their existing transporter and entrusted them with the job of transport till port. For customs formalities they engaged a good jobs after proper cost evaluation and entered into contract for freight with shipping company agent. The response for company's export was very good and the company could get as many as 15 customers within first two months and reached to a level of Rs 250 million per month by the end of first half of the year. Based on this response the export volumes were expected to grow to a level of Rs 400 million per month by the end of the year. When the review was made at the end of the year, company found that export volumes had in fact come down to the level of Rs 120 million which was much lower than it had reached in the first half of the year. The managing committee had an emergency meeting to discuss this and the export manager was entrusted with the task of identifying the reasons for this decline. Mr. Laxman Kumar, Chairman of ABC Ltd. decided to visit the customers for getting the first hand information. When he discussed the matter with the customers, the feedback on the quality and price were good but the

customers were very upset on the logistic services due to delayed shipments, frequent changes in shipping schedules, improper documentation, improper identifications, package sizes, losses due to transit damages etc. After coming back, the export manager checked the dispatch schedules and found that production and ex-works schedules were all proper. Then he studied the logistics systems and found that the logistics cost was very high and all the logistics people were de motivated due to overwork and were complaining of total lack of co-ordination and the system had become totally disorganized.

Questions :

1. Analyze the case from the perspective of operations system.
2. Explain the problems experienced by ABC Ltd. What is the main cause of these problems?
3. What logistics model should the company go for to ensure proper operations of the co

1(b) A reputed manufacturing organization , located at Balaju , Kathmandu, is going to produce two types of products in a certain season. While producing these products it considers the various limitations mainly availability of raw materials , demand of the products, and warehouse capacity. For producing these products two types of raw materials are being used. Each unit of first product requires 3 units of first type of raw materials and 2 units of second type of raw material while each unit of second product requires 4 units of first type of raw material and 1 unit of second type of raw materials. The organization has availability of 120 units of first type of raw material and 40 units of second type of raw materials. The first product must be manufactured at least 10 units in order to meet the market demand. However, due to warehouse capacity and market demand the organization has to produce exactly 30 units products in total. The profits per unit of two products have $ 6 and $ 5 respectively.

(i)   Formulate the problem in Linear Programing model.
(ii)   Determine the number of each type of product that would maximize the total profit by using simplex method.
(iii) How much is the maximum profit?
(iv)   Comment on the significance of the solution obtained.   (15)

Group "B"
Problem Solving / Critical Analysis Questions
Attempt Any THREE Questions :   [**3** $\times 15 = 45$ ¿

2. Explain about the location decision for a new product or service. Discuss the factors affecting location decision. Also mention the strategic importance of location.
3. From the following information determine the optimum transportation schedule in order to minimize transportation costs.

Plant	(Unit transportation cost in Rs.)			Supply (units)
	Markets			
	A	B	C	
P	5	2	8	150
Q	4	3	5	150
R	2	4	-	200
S	6	3	4	250

Demand (units)	250	200	175	

There is no transportation facility between plant R and Market C.

4.(a) Explain about production system of an organization. Discuss any two types of production systems.

4. (b) From the following information find the optimal assignment so that the profit is maximized on the basis of one machine to one job.

Machines	Profit in Rs.			
	Jobs			
	A	B	C	D
X	1800	2400	2800	3200
Y	800	1300	1700	1900
Z	1000	1500	1900	2200

5. (a) What is material requirement planning (MRP)? Discuss its merits and demerits
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5. (b) The following table gives the inspection data relating to 10 samples of 100 items each, concerning the production of bottle corks.

Sample Number	1	2	3	4	5	6	7	8	9	10
Number of defectives	5	3	3	6	5	6	8	10	10	4

On the basis of infofmations given above :

(i) Find the central line and control limits. Also prepare the control chart for fraction defective.

(ii) Comment on the state of control of the process.

Group "C"
Concept Based Short Answer Questions

Attempt any FIVE Questions.   [5 $\times 5 = 25$ ¿

6. What is plant layout? Why is layout planning important?

7. What do you mean by Total Quality Management (TQM)? Describe briefly any two principles of TQM.

8. What is Quality Function Deployment? Explain briefly.

9. Write the dual of the following primal problem.

Min. C = 120 x_1 − 150 x_2
Subject to Constraints :
18 x_1 + 25 x_2 ≤ 100
20 x_2 − 40 x_3 ≥ 153
16 x_1 + 50 x_3 = 205
and x_1 , x_2 , x_3 ≥ 0

10. A company requires 1000 units per month. Ordering cost is estimated to be Rs.50 per order. The carrying cost is Rs.2 per unit per year. The purchase price is Rs. 10 per

unit. Find (i) the economic lot size to be ordered (ii) the total annual cost.

11. A small manufacturing facility is supposed to get established in order to supply parts to three heavy manufacturing facilities. The existing plant locations with their coordinates and volume requirements are given in the following table.

Plant Location	Coordinates (x, y)	Volume (Parts per year)
A	(250 , 270)	3500
B	(325 , 420)	5500
C	(420 , 130)	3000

Use centre of gravity method to determine the best location for the new facility.

THE END