

MGT 4043 Operations and Quality Management

Answer all questions

Time: 03 hours

Q1. Read the case study given below and answer the questions that follows.

Davidson Ltd Manufacturers**BACKGROUND**

Davidson Ltd manufactures and sells a variety of board games and toys. The board games use dice, counters, cards, paper money etc and are based on holidays, wind surfing, cycling, horse racing, mysteries etc. The toys are classified as soft and hard. The soft toys are made from non-toxic, flame resistant polyester fibre, e.g. teddy bears, fur animals etc. The hard toys are made from non-toxic plastic and wood. Davidson Ltd's main customers are large retailers and wholesalers. It employs over 100 people.

The company has four main games-W, X, Y, Z. All four games are currently sold to the trade.

Many of the toys produced are high-quality and need to be packed with care. Management is concerned about the amount of time which this takes. For several weeks quality control staff has been engaged in "time and motion studies", and analyzing work practices with the operatives directly involved.

Davidson Ltd has just started to analyse its customer for toys, with a view to reviewing its pricing policy for large orders and/or type of customer.

Previous research has established that the sales of W, X, Y, and Z are all subject to the same seasonal patterns as follows.

Quarter	1	2	3	4
Seasonality	-25%	-25%	0	+50%

All four games are currently sold to the trade for \$20.00 each. Davidson Ltd's management accountant has estimated that the contribution to profit per unit of W, X, Y, and Z is respectively \$3, \$2, \$4 and \$4.

PRODUCTION OF BOARD GAMES

Two games, X and Y, are manufactured in the same way on the same equipment. There are three stages in the manufacture: boarding, printing, and packaging. The manufacturing times required for each game (in minutes) and the total time the equipment is available each week (in hours) are as follows.

	Boarding	Printing	Packaging
Game X	2 mins	3 mins	1 min
Game Y	2 mins	6 mins	2 mins
Total time available each week	70 hours	120 hours	50 hours

The current stock and demand is such that, for the next few weeks, at least twice as many of games X must be produced as games Y. Company policy is to maximize contribution to profit.

Questions:

- Determine the optimum weekly contribution to profit from games X and Y by formulating, and graphically solving, the linear programming production model.
(14 Marks)
- Explain your solution to (a) above for management, including recommendations for optimal product mix and profit.
(06 Marks)

Total 20 Marks)

Q2 Hayden Ampere Inc., produces a line of Electric Meters installed in residential buildings by electric utility companies to measure power consumption. Meters used on single-family homes are of two basic types for different voltage and Ampere ranges. In addition to complete meters, some parts and sub-assemblies are sold separately for repairs or for changeovers to a different voltage or power load.

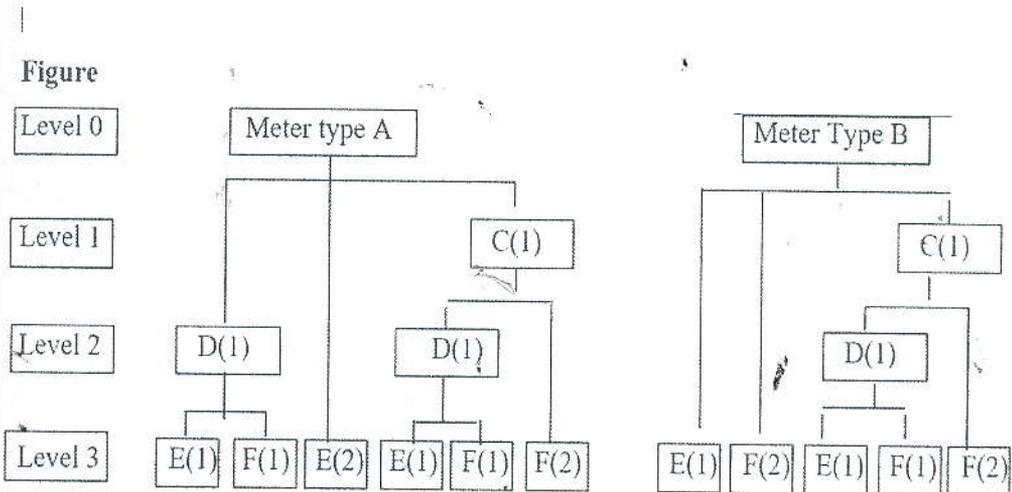
The demand for the meters and components originates from two sources: regular customers who place firm orders, and unidentified customers who make the normal random demands for these items. The random requirements were forecasted using past demand data.

The table below shows the requirements for Meters A and B, sub-assembly D, and part E for a six-month period (months three to eight).

Month	Meter A		Meter B		Subassembly D		Part E	
	Known	Random	Known	Random	Known	Random	Known	Random
3	1500	375	600	90	300	105	450	120
4	900	375	450	90	270	105	525	120
5	450	375	750	90	375	105	450	120
6	1050	375	600	90	300	105	375	120
7	900	375	450	90	225	105	300	120
8	1050	375	1050	90	240	105	300	120

For the meter and component requirements specified in the above table assume that the quantities to satisfy the known demands are to be delivered according to customers' delivery schedules throughout the month, but that the items to satisfy random demands must be available during the first week of the month.

The figure below shows the product structure for Meters A and B, in the typical way using low-level coding, in which each item is placed at the lowest level at which it appears in the structure hierarchy. Meters A and B consists of two subassemblies, C and D, and two parts E and F. Quantities in parentheses indicate the number of units requires per unit of the parent item.



The table below shows the inventory records and the lead Time.

Item	On-Hand Inventory	Lead time (Weeks)
A	75	2
B	90	2
C	60	1
D	45	1
E	45	1
F	60	1

The schedules assume that all items are to be available in the first week of the month.

Based on the above information answer the following questions.

- a) Prepare the Master Schedule for the month 3.
(04 Marks)
 - b) Prepare a Material Requirements Planning Schedule for Meters A and B, sub-assemblies C and D, and Parts E and F.
(12 Marks)
 - c) Prepare the Final Production schedule for the month 3.
(04 Marks)
- (Total 20 Marks)

- Q3. a) Explain operations management and its objectives with the focus on to the customer service and resource utilization.
(06 Marks)
- b) Define the term "Scope of Operations Management" and briefly explain the activities, which are included under the scope of Operations Management.
(08 Marks)
- c) *"The primary goal of the plant layout is to maximize the profit by arrangement of all the plant facilities to the best advantage of total manufacturing of the product."*

Explain briefly the importance and objectives of plant layout

(06 Marks)
(Total Marks 20)

Q4. a) Define the term "Value Analysis" and explain the basic steps involved in the value analysis.

(05 Marks)

b) *"The Quality of a product or service is the fitness of that product or service for meeting or exceeding its intended use as required by the customer".*

Identify and explain the fundamental factors that are affecting the quality of products and services.

(09 Marks)

c) *"Manufacturing a product or generating a service which meets the customer requirements must be managed in a cost-effective manner, so that the long-term effects of quality cost on the business is a desirable one".*

In view of the above statement, explain the different types of cost of quality associated to a manufacturing organization.

(06 Marks)

(Total Marks 20)

Q5. a) *"The basic objective of the purchasing function is to ensure continuity of supply of raw materials, sub-contracted items and spare parts and to reduce the ultimate cost of the finished goods".*

Based on the above statement list out and explain the "Parameters of Purchasing."

(06 Marks)

b) *"Productivity has now become an everyday watch word. It is crucial to the welfare of industrial firm as well as for the economic progress of the country".*

In your view what are the factors influencing productivity nowadays.

(08 Marks)

c) *"Method study is the systematic recording and critical examination of existing and proposed ways of doing work, as a means of developing and applying easier and more effective methods and reducing costs."*

Based on the above statement explain the steps or procedure involved in Method Study.

(06 Marks)

(Total Marks 20)