

**ADVANCED GCE UNIT
BUSINESS STUDIES**

Further Operations Management
THURSDAY 21 JUNE 2007

2877

Afternoon

Time: 1 hour 30 minutes

Additional materials: Answer Booklet (8 pages)



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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the spaces provided on the answer booklet.
- Answer **all** questions.
- Write your answers on the separate answer booklet provided.
- If you need extra sheets of paper, fasten these sheets securely to the answer booklet.
- Read each question carefully and make sure you know what you have to do before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is 60.
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.

This document consists of **4** printed pages.

SWALLOWS FOOD AND DRINKS LIMITED (SFDL)

SFDL is one of the largest producers of soft drinks in Europe. Production is based at Highton in Somerset where over 10 million litres of juice and juice drinks are produced each week. In 1995 SFDL was taken over by the American multinational company, SeaSpray. SFDL produces a range of branded products as well as most of the own brands sold by the UK's leading supermarkets. It also packages many major brands for other companies in the soft drinks business. SFDL's site is over 100 hectares and is used for production, warehousing and distribution. 5

SFDL sources its raw materials from over 30 countries, annually importing about 100 000 tonnes of fruit juices, purees, pulps and concentrates. For example, huge quantities of frozen fruit juice come from Brazil, whilst grape juice comes from France and Italy. Each ingredient is traceable from bulk delivery, through manufacture and processing to its final destination on the shop shelf. Road tankers bring the concentrated orange juice from SFDL's own terminal at the port of Swanbury, some 30 miles away. After samples have been quality tested in the laboratory on site, the juice is pumped into storage tanks. Juices are then piped to the processing line, where dilution and blending can take place. Preservatives are also added before the juice is packaged into cartons or bottles. 10 15

Twenty production lines are in operation at the plant. Flow production is used to produce SFDL's most popular product, the orange drink Summer Sun. It is produced continuously 24 hours a day, seven days a week on the two newest computer controlled lines. On the other lines, a system of batch production is used to make the ranges of products demanded by SFDL's various customers. These older production lines operate a daily 14-hour double shift system, for five days a week. This allows for them to be cleaned and reset between batches. Overtime can be worked if demand is very high. All the production lines can produce a range of types of products from the small single serve carton, popular in school lunch boxes, through to standard one litre cartons, screw cap bottles and larger cartons of juice drinks bought by catering companies. 20 25

Being a food producer, SFDL has to check the quality of its products frequently. All raw materials are sampled immediately on delivery. Testing usually takes about a day to complete. Only when authorisation has been received from the laboratory will products be used. Batches leaving the production line are also tested every 30 minutes to ensure no contamination has taken place during processing. Supermarket chains, which are SFDL's biggest customers, insist on the very highest quality standards from their suppliers. Because many of the products have a short shelf life it is important that they are delivered to customers on time. SFDL has a fully computerised system to ensure optimum stock control, rotation and delivery from the warehouse and distribution centre. 30 35

Demand for SFDL's products has grown rapidly over the last 10 years and research carried out for SFDL's Marketing Department suggests this trend will continue. Annual consumption in the UK now averages 200 litres of juice drinks per person. The Operations Director is pressing the Board for significant investment in new plant in order to switch more lines to continuous flow production over the next three years. 40

Market research has also indicated demand is growing strongly for premium priced fresh fruit juice drinks and "smoothies". As the shelf life of such products is very short, these products need to be produced in relatively small batches. Technicians in the Operations Department laboratories are currently working on new ranges of fruit juice recipes that SFDL hopes to test on consumer panels in the near future. 45

The Marketing Department has recently received an enquiry from one major northern supermarket chain for 20000 litres of “Mango, Orange and Banana Smoothie” in one litre cartons and 250ml bottles, for delivery to its central distribution depot in Manchester within 28 days. SFDL’s Marketing Director is keen to win the order and has asked the Operations Director to discuss the implications. The Operations Director has prepared a forecast activity duration sheet (see Table 1 on page 4) and critical path network diagram for the possible order (see Fig. 1 on page 4). 50

Answer **all** questions.

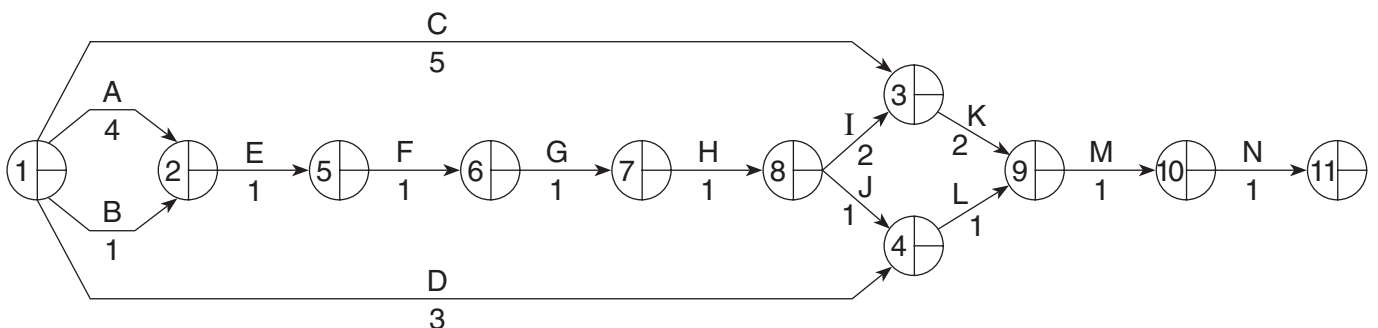
- 1 (a) Analyse **two** benefits to SFDL of having all production, warehousing and distribution facilities on one site. [6]
- (b) Analyse **two** reasons why it is important for the Marketing and Operations Departments at SFDL to work together. [6]
- (c) Evaluate the implications for SFDL of switching “*more lines to continuous flow production lines over the next three years*” (lines 39–40). [16]
- 2 (a) The Operations Director has produced a forecast activity duration sheet for the possible Mango, Orange and Banana Smoothie order. The order is for 10000 one litre cartons and 10000 litres in 250ml bottles. (Refer to Table 1 and Fig. 1.)
 - (i) Calculate the earliest start time for activity K. [1]
 - (ii) Calculate the latest finish time for activity J. [1]
 - (iii) What is the total float for M? [1]
 - (iv) What is the minimum number of days it will take to complete the order if there are no delays in the production schedule? [1]
- (b) Discuss whether Critical Path Analysis is a useful technique for helping SFDL decide whether to accept the supermarket order. [10]
- (c) Evaluate why quality is important for SFDL. [16]

Table 1 – SFDL Ltd – FORECAST ACTIVITY DURATION SHEET

Supermarket order for Mango, Orange and Banana Smoothie

ACTIVITY	TASK	Duration (days)
Suppliers		
A	Time taken from order to delivery of mango and banana pulp	4
B	Time taken from order to delivery of fresh orange juice	1
C	Time taken from order of cartons to delivery from suppliers in Sweden	5
D	Time taken from order to delivery of plastic bottles from UK supplier	3
Production		
E	Pump fruit juice into tanks prior to mixing.	1
F	Test fruit juices in laboratory	1
G	Cleaning, preparation and re-setting of machines	1
H	Mixing and blending fruit pulp and juices	1
I	Production Line 1: The Carton Line – Smoothie packaged into 10 000 one litre cartons	2
J	Production Line 2: Bottling line – Smoothie packaged into 40 000 250 ml bottles.	1
K	Packing cartons	2
L	Packing bottles	1
Warehousing and Distribution		
M	Palleting, packaging and loading onto refrigerated lorries	1
N	Delivery to supermarket central distribution depot in Manchester	1

Fig. 1 Critical Path Network Diagram for SFDL – The Smoothie Order



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