EXAMINER'S REPORT

MAY 2000

LOGISTICS MANAGEMENT

General Comments

Generally the results were not so good this year with only three "As" the highest 76%. Overall 47% failed and 22% of these are eligible to pass by compensation. This compares with 43% and 54% who failed in 1999 and 1998, most of whom passed in the Autumn in both cases. In recent years the case and the theory were done well while the quantitative questions were not done well. This year people did well in the case and the Section D quantitative question, the one on Networks. The most obvious problems were with the quantitative parts. Once again I will focus on these aspects in this report.

The average score on the Case Study was 46%. Those who got an E or an F got on average 73% of the average mark on the Case. For the theory section the average score was 34%, which is lower than usual maybe because of the new text, and those who got an E or F got 79% of this on average. Thus, those who did poorly generally had a reasonable understanding of logistics theory. For Section C, which is the quantitative section that is less structured and requires more thought, those who got an E or F did worse than in any other section. The overall average for this section was 33% and those who got an F got only 52% of this on average. This section tests one's general ability to use a quantitative approach in marketing situations. The other quantitative section had results virtually identical with those of the Case: the overall average was 43% and those who got an F had an average of 76% of the overall average. This quantitative section contains relatively predictable quantitative applications that follow set rules. Early on in this course when the quantitative sections were combined into one people tended to do the more rule-based questions such as in Section D and avoid those in Section C, hence the division into two sections.

The way this course and exam is structured requires one to really get into the theory, the techniques and how to apply the ideas in practice. This follows a learning cycle. Ideally people should look at the cases early on to get an idea of the types of problems which occur. These are mixtures of marketing, logistics, mathematics and strategy. Subsequently one should get into the theory, but not spend the year learning it off. Usually it is reasonably well done. Basically I expect a clear understanding of what is in the text and some practical illustrations from outside, such as from Irish applications. The middle part of the year should be spent on the quantitative techniques, hopefully linking them into the cases and the theory, and anecdotes about Irish companies where possible.

Very occasionally people get through by focusing on one of the parts, but this year there were few instances of full marks for a question. Consequently, people who failed invariably did one of the sections very poorly and were not able to compensate from another section. It is safer to prepare all the sections.

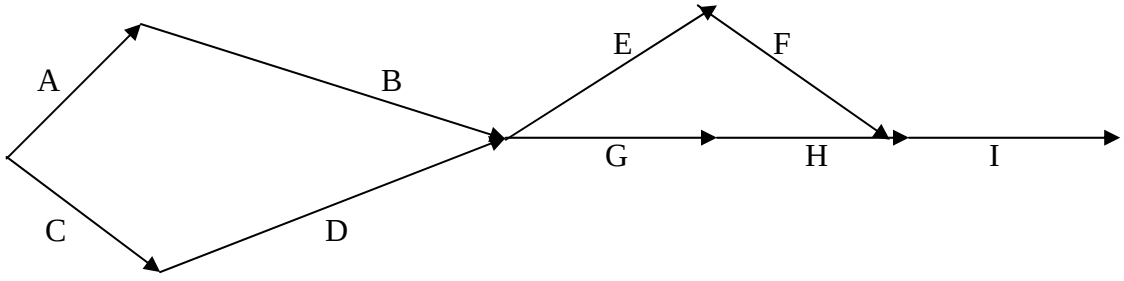
The case questions are geared at bringing one through a process of analysis, evaluation, diagnosis and prognosis. Most people tried all parts of the case section, and attempted all the sections. Consequently there were fewer than ever failures due to not attempting one or more sections. In the past this was the most common cause of failure and the reason for the high average failure rate. It should be understood that Logistics is important not just of itself but also because it requires one to put on one's quantitative thinking cap when addressing marketing problems.

Quantitative questions

Firstly, before I get into specifics, there is no need to do roughwork and then write your answer out neatly. It wastes your precious time. Do the question as best you can. If you think you are making a mistake say so, and try to correct the mistake. If you blank out, just leave two pages so that you can move onto other questions. Maybe later you will be able to do the rest of that question. Do not waste your time doing restarts.

The idea of having two different quantitative sections is to separate the less standard from the standard, the unstructured from the straightforward application of algorithms. The **Project Evaluation Review Technique (PERT)** question is an example of a standard application of an algorithm that many people got mainly right. This is a cut-down version of a linear programming problem. Many people missed the last part of this question. The critical path corresponded to activities A-B-G-H-I which took 15 days. The standard deviation of each time on the critical path was 1/6, 4/6, 4/6, 2/6 and 1/6. The variance of the sum is the sum of the variances. You square the individual standard deviations, sum them, and then take the square root giving 1.03 days. The Z-score for 99% sure of completion requires one to look in tables for areas under the Standard Normal Curve for 0.4900. For Z = 2.32 it is .4898 and Z = 2.33 it is .4901, so you could guess at Z = 2.327, which is multiplied by the 1.03 days to give 2.4 days cushion that should be added onto the project expected length of 15 days to be 99% sure of completion. So, it should be started 17½ or 18 days before the scheduled meeting date.

Some people had difficulty with drawing the network. The following is the correct one.



The difficulty arose with the use of dummy activities. Some people added in dummy activities where B and D meet, and where F and H meet. There is nothing wrong with doing that, but please redraw the network afterwards so that you can get rid of the dummy activities where

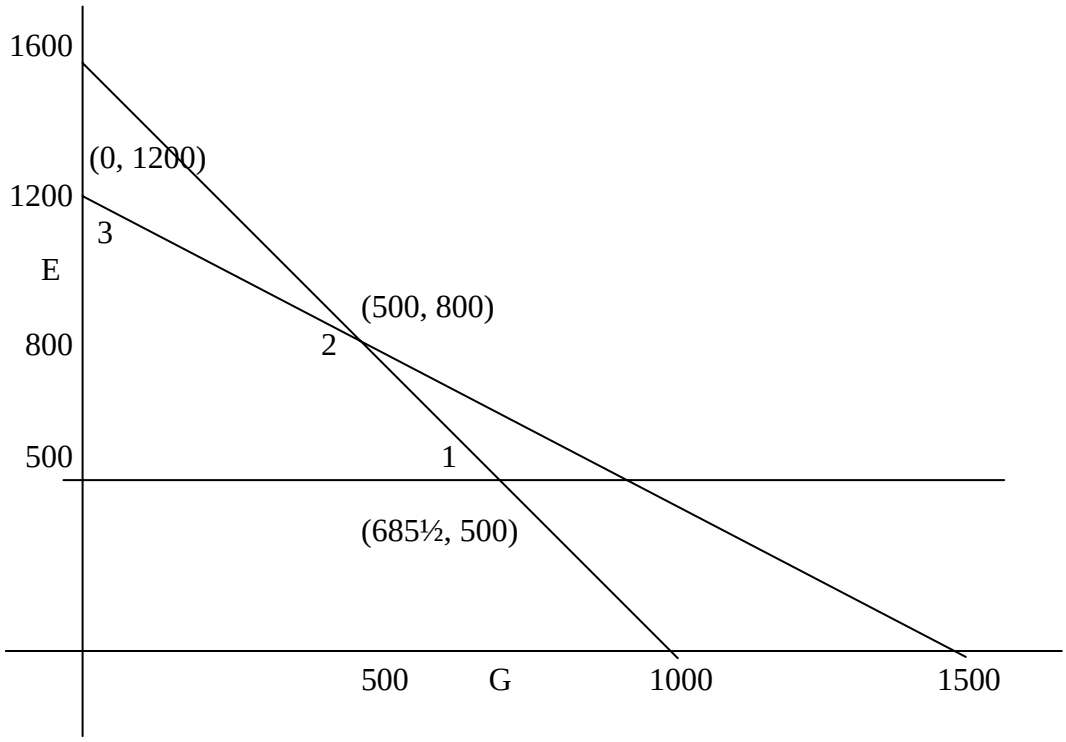
possible. Very few people can draw a network correctly the first time. It is easy to check that a network is correct. Just check the precedences at each node with the table.

The linear programme was badly done. This is an important topic and is likely to continue to appear on exams. The following is a summary of the solution.

Maximise Profit = £3G + £3E
Subject to:

3/5 G	+	¾ E < =	900
2/5 G	+	¼ E < =	400
		E < =	500

G >= 0 E > = 0



(a) Currently Point 1 (685½, 500) is the best giving £3562½ profit.

(b) If the packaging constraint was removed the best solution becomes Point 2 at (500, 800) giving £3900 profit, which is £337½ more.

(c) With the packaging constraint removed and the profit contribution from Evergreen raised to £4 the profit from (500, 800) would become £4700 profit, which is £800 more. Also, the best solution becomes Point 3 at (0, 1200) giving £4800 profit, which is £100 more again. Two questions arise. You currently have a mix between G and E. Do you want to get out of G entirely and produce only E for the sake of an extra £100? And will the extra £800 contribution to profit more than cover the advertising programme, whatever way it is discounted to be expressed in terms of effect on contribution?

Section C contained a **simulation** question that was really easy. I include this kind of question occasionally because, whenever there is no obvious model, the rule is that you simulate. Some made a mess of it.

The history of rental demand was	70	80	90	100	110	
With data gathered over 25 cases	2	5	8	7	3	
Multiply this up to 100% to give	8	20	32	28	12	
This gives simulation intervals		00-07	08-27	28-59	60-87	88-99

The idea with simulation is that a two figure random number, i.e. one with equal likelihood of coming between 00 and 99, will fall into these intervals with likelihood that is proportional to the sizes of the intervals, which correspond to the percentages, which are in accord with the 25 cases of gathered data. To do this question you must understand this."Monte Carlo Simulation" idea.

The task was to simulate 5 hours	1	2	3	4	5	
Using random numbers	15	48	71	56	90	
Which simulate demand of	80	90	100	90	110	totalling 470
Which leads to customer losses of	--	--	10	--	20	totalling 30.

(a) 30 customers are likely to be lost.

(b) The average number demanded for rent is 470 / 5 = 94. Multiplying the original demand figures by the probabilities, 70 by .08 + 80 by .20 etc. gives 91.6 indicating that the simulation was slightly higher than expected.

(c) There were many weaknesses in this simulation. The obvious one was that the simulation was too short. Also the 25 cases was low. It was assumed that the 5 hour evening when the video shop is open has even demand over the five hours. Finally, current staff policy is to employ only one assistant. So, how do we know that demand is not potentially greater than 90? Is it not possible that demand is related to the level of service, i.e. whenever there is a queue customers go to another video shop?

The other Section C question was on **stock (inventory) control**. This is a long section in the text and likely to occur every year. I was very surprised that some people did not get the economic order quantity of 82 units, and reorders 2.45 times a month. Generally the key to my seeing if inventory is understood is to put in something unusual and to require a calculation of total costs. Keeping one's head is critical.

This question appeared on a previous paper. It involved discounts. The key was to realise that the discount affects not only the purchase price but also the holding cost because the cost of holding stock was related to the stock value.

People got confused about part (c) of the question which asked "whether it would be advisable to apply the same policy to less and more expensive products". The question here was which dominated more, the carrying cost or the discount. The answer was the carrying cost. Consequently, if the price went up you should be less likely to order more, and vice versa.