Please answer the question in Section A, and **ONE** question from each of Sections B, C and D.

(If more than the specified number of questions in Sections B, C and D are attempted, delete those questions you do not wish to have marked. Otherwise the examiner will mark the **FIRST** question in Sections B, C and D.)

Section A carries **40%** of the marks. All other questions carry equal marks.

Do NOT repeat questions in the answers, but show clearly the number of the question attempted on the appropriate page of the Answer Book.

(Note: Marks are awarded for the relevant use of contemporary Irish and international examples of marketing practice)

SECTION A (40%)

1. **Case Study: Parkway**

   (a)   Briefly review the issues and facts that Parkway should take into account when deciding on the correct warehousing numbers and locations, the correct choice of the physical distribution system, and the implications of these decisions on the stock holding requirements, production limitations and order scheduling.

   (b)   Evaluate the profitability and performance of the Hollins and Parkway operations by product, region and distribution channel.

   (c)   Describe the changes that you think would be appropriate for the new combined Hollins and Parkway operations.

   (d)   Use your evaluations from (b) to justify your proposals.

SECTION B (20%)

2.   *"The challenge to the global business will increasingly be seen as logistical."*
     Martin Christopher
     What are the implications for a business when it becomes global?
     Discuss the role that logistics can have in businesses that are global.

3.   Examine how one should research customer service needs and measure customer service performance.   **P.T.O.**

SECTION C (20%)

4. A company uses 1,200 packets of photocopying paper each year of 48 working weeks. The variable costs of placing an order, progressing delivery and payment have been estimated at €20 per order. Storage and interest costs have been estimated at €1.40 per packet per annum based on the average annual stock. The price from the usual supplier is €10 per packet for any quantity. The usual supplier requires three weeks between order and delivery.

   A potential supplier has offered the following schedule of prices and quantities: €9 per packet for a minimum quantity of 500 packets at any one time, €8.60 per packet for a minimum quantity of 750 at any one time, and €8.40 per packet for a minimum quantity of 1,000 at any one time.

   If 500 packets or more are received at the same time an additional fixed storage cost of €300 will be payable for the use of additional space for the year. Assume certainty of demand, lead time and costs.

   (a) What is the optimum economic order quantity when using the existing supplier?

   (b) Calculate the stock level at which orders will be placed.

   (c) Determine the total minimum cost per year from the existing supplier.

   (d) What would the total minimum cost per year be if one changed to the new supplier?

5. A vegetable shop operates on a self-service basis. Customers arrive, collect their vegetables and go to the counter where the assistant weighs, prices and bags the purchases, and then accepts payment. Customers wait in a single queue, and are served on a first-come, first-served basis.
   The inter-arrival time probability distribution is as follows:

IAT (seconds)	20	30	40	50	60	70	80
Probability	0.07	0.14	0.26	0.22	0.16	0.10	0.05

   Use the following random numbers to simulate the inter-arrival times of 12 customers:
   14   87   73   30   95   10   92   45   80   13   55

The probability distribution of time to be served is:

Service Time (seconds)	20	30	40	50	60	70	80
Probability	0.08	0.17	0.28	0.20	0.14	0.09	0.04

Use the following random numbers to simulate the service times of the 12 customers:
04   23   01   68   85   30   80   26   55   59   91   11

Use your information to find the average waiting time and the average time spent in the vegetable shop.

SECTION D (20%)

6.   The sales manager of SuperTonic (Ireland) Ltd. has budgeted €240,000 to advertise one of the tonics that it markets throughout Ireland. The advertising programme consists of running ads in two different magazines. An ad in the magazine Irish Health costs €4,000 per run, whereas an ad in the magazine Irish Fitness Monthly costs €5,000 per run. Past experience has shown (1) that at least 20 runs in Irish Health and at least 10 runs in Irish Fitness Monthly are needed to penetrate the market with any appreciable effect; and (2) that no more than 50 runs in either of the two magazines are needed. It is assumed that a run in one magazine is as good as one in the other, and that there are no diminishing returns for multiple runs.

(a)   Based on the given data, how many runs should be made in Irish Health and how many in Irish Fitness Monthly?

(b)   The budget could possibly be increased or decreased by up to €40,000. Specify how this could affect the mix of usage of the two magazines.

(c)   Another area of uncertainty is the effectiveness of advertising in the two magazines. Some opinion suggests that advertising in Irish Health is between 20% and 30% more effective than advertisng in Irish Fitness Monthly. If this were true, how might it affect the solution to (a)?

P.T.O.

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7. Marketing Research Ltd. has developed a questionnaire for a survey. The following table shows the tasks involved, the immediately preceding tasks, and for each task the most likely estimate, the optimistic estimate and the pessimistic estimate.

Task	Preceding tasks	Most likely (m)	Optimistic (a)	Pessimistic (b)
A Design Questionnaire	-	3	2	4
B Sampling Design	-	12	10	20
C Pilot Survey	A	5	4	12
D Recruit Interviewers	B	4	2	6
E Train Interviewers	D, A	3	3	3
F Allocate Interviewers	B	4	3	5
G Undertake Interviews	C, E, F	10	8	18
H Data Entry On Computer	G	3	2	4
I Debrief Interviewers	G	2	2	2
J Data Analysis	H	5	4	6
K Write Report	I, J	4	2	12

Duration in Days (column group header spanning Most likely, Optimistic, Pessimistic)

Using the Project Evaluation Review Technique (PERT) the mean time, μ, and the standard deviation, σ, for the duration of each task are estimated from the most likely (m), optimistic (a) and pessimistic (b) estimates by using the formulae:

$$\mu = (4m + a + b) / 6 \qquad\qquad \sigma = (b - a) / 6$$

(a) For each task find the mean and standard deviation.

(b) Draw a network for this survey and use the mean times to find the critical path.

(c) Determine the mean and standard deviation of the critical path duration.

(d) What is the probability that the length of the critical path exceeds 50 days?
State any assumptions that you make.
(This question requires statistical tables for the Normal Distribution.)