LAND ECONOMY TRIPOS Part IA
LAND ECONOMY TRIPOS Part IB

Wednesday 01 June 2011   13.30 – 16.30

Paper 3

QUANTATIVE METHODS FOR LAND ECONOMY

Answer **five** *questions.*

Answer **two** *questions from* **Section A**. *Answer each subpart of each question you choose.*
Answer **two** *questions from* **Section B**. *Answer each subpart of each question you choose.*
Answer **one** *question from* **Section C**.

Section A *will be* **weighted 20 %** *of the final mark for Paper 3,*
Section B *will be* **weighted 20%** *of the final mark for Paper 3 and*
Section C *will be* **weighted 20%** *of the final mark Paper 3. Unless otherwise stated each part of each question carries equal weight.*

Answers from **each** *Section* **must** *be written in a separate booklet. Candidates should show all workings or annotate their answers in the exam booklet. Any loose sheet workings should be attached.*

Write your number **not** *your name on the cover sheet of* **each section.**

STATIONERY REQUIREMENTS
Graph Paper x 5 sheets
20 Page Answer Book x 3

SPECIAL REQUIREMENTS
New Cambridge Statistical Tables
Statistical Formulae Sheet
Approved Calculator

You may not start to read the questions
printed on the subsequent pages of this
question paper until instructed that you may
do so by the Invigilator

SECTION A - Mathematics

1. You are given the following demand function for the commodity X:

    $D_x = 300 - 0.5p_x^2 + 0.2p_y + 0.5Y$

    where D_x = quantity demanded of X, P_x = the price of X, P_y = the price of a related commodity, and Y = consumer income.

    (a) Compute the price elasticity of demand when $P_x = 12$, $P_y = 10$ and Y = 200.

    (b) Compute the cross elasticity of demand for X with respect to P_y when $P_x = 12$, $P_y = 10$ and Y = 200.

    (c) Compute the income elasticity of demand for X when $P_x = 12$, $P_y = 10$ and Y = 200.

2. A monopolist produces two goods. The respective demand functions are:

    $p_1 = 36 - 3Q_1$

    $p_2 = 40 - 5Q_2$

    where p_1 = price of first good, p_2 = price of second good, Q_1 = quantity of first good, Q_2 = quantity of second good.

    The joint-cost function is:

    $TC = Q_1^2 + 2Q_1Q_2 + 3Q_2^2$

    (a) Determine the quantities and prices that maximise the profit of the monopolist.
    (b) Find the maximum profit.

    (b) Find the marginal revenues and marginal costs for these quantities and prices.

3.   The total cost function of a firm is described by the following function:

$$TC = 5L^2 + 6K^2 - LK$$

where TC is total cost, L is units of labour and K is units of capital.

The total output is given by the function:

$$Q_o = L + 2K = 24$$

Find the values of labour and capital that minimise total cost and the minimum total cost, subject to the fixed output.

SECTION B - Statistics

4.   A lecturer designs a course to increase reading speed and comprehension and to evaluate the course students are tested before and after the course, individual test scores are:

Student	A	B	C	D	E	F	G	H	I	J
Before	100	170	135	167	200	118	127	93	112	136
After	136	160	120	169	200	140	163	101	138	129

(a) Construct, interpret and explain a 95% confidence interval for the difference in before and after scores as to whether the course has affected scores significantly.
(b) State the null and alternative hypotheses in this case.
(c) What would be a Type I error here? Express your answer in statistical and layman's terms.
(d) How could you minimise making a type I error.
(e) Discuss what factors might have affected the result.

(TURN OVER)

5. Three laboratories, A, B, and C, are used by food manufacturing companies for making nutrition analyses of their products. The following data are the fat contents (in grams) of the same weight of three similar types of peanut butter.

Peanut Butter	Laboratory A	B	C	D
Brand 1	16.6	17.7	16.0	16.3
Brand 2	16.0	15.5	15.6	15.9
Brand 3	16.4	16.3	15.9	16.2

Anova table (k =3 brands, N =12 values)

Source	S.S.	d.f.	M.S.S.
Between brands	1.62	3 - 1 = 2	1.62/2 = 0.81
Errors	1.96	11 - 2 = 9	1.96/9 = 0.22
Total	3.58	12 - 1 = 11	

(a) What are the assumptions behind the analysis of variance?

(b) State the null and alternative hypotheses and explain them in non - technical terms.

(c) At the 0.05 significance level test the claim that the means of the fat content are the same in the three brands of product by carrying out a one-way ANOVA.

(d) If there is a difference, is it significant at the 95% level?
Explain your result not only in statistical but also in nontechnical terms.

6.
(a) Discuss the following terms and their use in statistics:
   i) Standard deviation
   ii) Standard error
   iii) Type II error

Question 6 continued

(b) Emissions data for a sample of different vehicles are given for HC (hydrocarbon) and CO (carbon monoxide) both measured in grams per metre

HC	0.65	0.55	0.72	0.83	0.57	0.51	0.43	0.37
CO	14.7	12.3	14.6	15.1	5.0	4.1	3.8	4.1

(i) Find a correlation coefficient .

(ii) Using the significance level 0.05, test the claim that there is no significant linear correlation between the two variables.

SECTION C - Accounting

Answer EITHER Question 7 OR 8

7.   Answer **three** questions only.

(a) Discuss the concept of materiality and its usefulness in analyzing accounts.

(b) Discuss the limitations of ratio analysis.

(c) Discuss the extent to which a prospective shareholder can gain full and accurate information regarding a public Real Estate vehicle.

(d) Outline and evaluate the measures a large Real Estate investor might take to improve its cash flow.

8.

	£000	£000
Share Capital		400
Profit and Loss b/f 31.12.09	213	
General Reserve		12
Administration costs	35	
Advertising costs	127	
Cash	20	
Creditors		200
Debtors	75	
Interest	1	
IT equipment	100	
IT equipment Accumulated Depreciation		75
Land and Buildings	260	
Motor Vehicles	120	
Motor Vehicles Accumulated Depreciation		110
Provision for doubtful debts		8
Purchases	45	
Salaries and wages	90	
Sales		300
Stock 31.12.09	19	
	1105	1105

i) Stock at 31.12.10 was £7,000.
ii) Depreciation should be charged as follows:
   Motor Vehicles 30% of cost.
   IT equipment 25% of cost.
iii) The provision for doubtful debts should be 20% of debtors.
iv) A vehicle is sold during the year for £5,000. Its net book value (NBV)is £8,000 and accumulated depreciation charged on it is £4,000.

(a) Above is the trial balance for Orange Markets Ltd as at 31/12/2010. After making the necessary year-end adjustments, prepare the Income Statement and the Balance Sheet for the year ending 31/12/2010. (75% of the mark for this question)

(b) Comment on the performance of Orange Markets Ltd, basing your analysis on the financial statements produced in Part A. (25% of the mark for this question).

END OF PAPER