THE OPEN UNIVERSITY OF SRI LANKA
BACHELOR OF MANAGEMENT STUDIES PROGRAMME
LEVEL 03 – 2005/2006
FINAL EXAMINATION 2006
QUANTITATIVE TECHNIQUES FOR MANAGEMENT 1 – MCU 1207

DATE : 05.03.2006	**TIME : 9.30 a.m – 12.30 p.m**

Duration: Three Hours
INSTRUCTIONS: ANSWER ANY FIVE (05) QUESTIONS.
All questions carry equal marks.
Use of non-programmable calculators are allowed.

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(1) (i) Solve $\frac{x+2}{4}+\frac{2x+3}{5}=5$

(ii) If $\frac{1}{x+1}+\frac{1}{4x-2}=\frac{1}{2}$ what is x?

(iii) If $a-2b=2$ and $2a-5b=2$ find a *and* b.

(iv) Two experienced workers and three trainees can complete a certain job in 4 days. 4 experienced workers and 4 trainees can complete the same job in half that time. If no trainees are available in a particular period how many experienced workers are needed to complete the same job in two days?

(v) If $2\log x-\log(x-1)-\log 4=0$, find the value of x.

(vi) If log 2 = .3010 and log 3 = -4771, what is the value of log 36?

(2) (i) An investor wishes to deposit money in a special account. His initial deposit is Rs. 500/- and thereafter he deposits money weekly with an increase of Rs.250/- per week. He has to make 20 such installments to qualify for a loyalty membership. At present he had made his 10^{th} installment.

a) What is the amount he had paid for his 10^{th} installment?
b) What is the amount he will have to pay as the last installment?
c) What is the total amount he will have to pay in future?

(ii) The 3^{rd} and 5^{th} terms of a geometric progression are 45 and 405 respectively. Identify the possible progressions.

(iii) Sunil wishes to deposit Rs 500,000/= for three consecutive years to earn some interest income. He can deposit in "account A" at 12% per annum on simple interest and "account B" at 10% per annum on compound interest. Assist Sunil to find the best alternative.

(3) The Management of a company has observed that their total cost and total revenue of their organization are represented by $x^2 - 10x = 40$ and $5x - 7$ respectively. x denotes the level of operations. These functions are valid between $x = 2$ and 20.

You are required to

(i) Graphically represent the above within the operating levels $x = 2$ and $x = 15$.

(ii) Using the graph find:
a) the operating level where the cost is minimized
b) the range where the company makes profits

(iii) Show these information in your graph

(iv) Using calculus techniques
Establish the answer to ii (a) above and identify the operating level which maximizes the profits.
[Key : Profit = Total Revenue – Total Cost]

(4) (i) What is meant by "census" in statistics?
(ii) Explain the reasons why researchers usually use samples instead of a census.
(iii) Explain the difference between random and non-random sampling techniques.
(iv) Explain the following sampling techniques and state the situations(s) when these techniques are most appropriate:
a) Simple random sampling
b) Stratified sampling
c) Cluster sampling
d) Judgmental sampling

(5) (i)
a) What are the averages that can be used to measure the central tendency of statistical data? Explain briefly.
b) Explain why the above averages are called measures of central tendency.

(ii) a) Explain skewness of data.

Following table shows the values of 1,000 invoices of a grocery.

Sales (Rs.)	No. of invoices
100 and upto 120	10
120 and upto 140	25
140 and upto 160	45
160 and upto 180	75

180 and upto 200	115
200 and upto 220	175
220 and upto 240	250
240 and upto 260	190
260 and upto 280	100
280 and upto 300	15

(source: company records)

Mean sales is Rs. 218.80 and the standard deviation is Rs. 37.02.

b) Estimate the modal sales of the grocery.
c) Compute the coefficient of skewness and comment on the dispersion of data.
d) Construct a histogram and explain the answer to 'c' above.

(6) (i) Explain price indexes, quantity indexes and value indexes with suitable examples.

(ii) Briefly explain the practical applications of the above indexes.

(iii) Following table shows the agricultural production of a farm in Mahaweli 'H' region.

Product	**Price (Rs./kg.)**	**Quantity ('000kg)**	**Price (Rs./kg.)**	**Quantity ('000kg)**
Rice	16	4	28	5
Onion	50	10	40	8
Bananas	24	8	28	10
Chillies	80	2	120	2.5

(Source ; Company records)

Calculate the following indexes for 2005 using year 2000 as the base year
b) Simple price, quantity and value indexes.
c) Aggregate price, quantity and value indexes.
d) Comment on the values of above indexes.