Uva Wellassa University, Sri Lanka

End Semester Examination – June 2009

EMG 242-3 Statistics for Management

Part C: Essay Question
Answer All Questions
Time: One (1.00) hour and 30 minutes
Total marks: 50

1. The daily output of a certain company appears to vary with the days of week. The output (1000 units) over the last 3 weeks is given below.

	Number of units of output				
	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	79	102	93	118	61
Week 2	80	108	96	123	64
Week 3	82	115	99	127	67

a) Plot the data. Is there any evidence for existence of a trend and a seasonal variation?
b) Calculate the 5-point moving averages; hence estimate the seasonal indices for each day of the week.
c) Calculate the deseasonalized values and fit a straight line to the deseasonalized data.
d) Forecast the daily output for the first three days of week 4 to the nearest unit of production.

(20 marks)

2. After the sample had been collected, it become apparent that the branches fell into three natural groups in term of sales- small, medium, and large. Form her data on all of the branches, the researcher found that of 210 randomly selected staff, 90 worked in small branches, 36 in medium-size branches and the rest works in large branches. In total, 96 of the selected staff had no days off for sickness, of which 52 worked in small branches, and 29 worked in large size branches.

a) Form a table showing information clearly.

b) Carry out an appropriate statistical test to investigate whether size of branch influences the occurrence of sickness absence. Interpret your results clearly.

(10 marks)

3. A). A distributor buys perishable articles for Rs.20 per item and sells them at Rs.25. Demand per day is uncertain and items unsold at the end of the day represent a write off because of perishability. If he under stocks he loses profit he could have made.
A 300 day record of past activity is as follows:

Daily demand (units)	No. of days	Probability
10	30	0.1
11	60	0.2
12	120	0.4
13	90	0.3
Total	300	1.0

What level of stocks should be held from day to day to maximise profit?

B). A quality control engineer wants to estimate the fraction of defective bulbs in a large lot of lightbulbs. From past experience, he feels that the actual fraction of defective bulbs should be somewhere around 0.2.
How large a sample should be taken if he wants to estimate the true fraction within 0.2 using a 95% confidence interval?

(10 marks)

4. Among all the income-tax forms filed in a certain year, the mean tax paid was Rs.2000 and the standard deviation was Rs.500.

a) A random sample of 750 tax forms is drawn. Calculate the probability that the average tax paid on the sample forms is greater than Rs. 1975.

b) Suppose that we randomly select one tax form. Can you calculate the probability that the tax paid on this sample form is greater than Rs. 1975? If so, calculate the probability. If not, explain why not.

(10 marks)