Uva Wellassa University
First Year First Semester Examination- 2006 December
STA 101-3 Quantitative Reasoning
Time: Three (3.0) hours
(Answer all questions)

Students are allowed to use not programmable calculators only.

a) Classify each of the following variables as qualitative/ quantitative and quantitative variable as discrete/ continuous. What can you say about scale of measurements?

i. Occupation of persons
ii. Number of vehicles owned
iii. Region of residence
iv. Volume of tree

b) State whether the following statements are True(T) or False(F)

i. The Standard Deviation is never negative.
ii. The average height in a class is also 60 inches. There are 30 people in a class. One can conclude that 15 of the students are less than 60 inches tall.
iii. If two data sets have same average and same Standard Deviation, their histograms must be the same.
iv. If the Standard Deviation of a list of numbers is zero, then its average must also be zero.
v. If 10 is added to each number in a list, then Inter Quartile Range is increased by 10.

(12 marks)

a). What is the most suitable method of measurement in each of the following survey. You should state the method and clearly indicate the data collection procedure briefly.

i. Collection information on the knowledge of English and IT among students in a given university.

ii. Getting world opinion on a controversial issue, such as bowling action of an international cricketer.

b). Conducting of two sampling surveys led to the following conclusions. Critically comment on the following things.

i. In a sample survey to study whether there is any relationship between general knowledge and subject combinations of university students it was revealed that there is higher correlation between general knowledge and the performance of the Arts students than that of Science students.

ii. Clergy to have a higher life expectancy than that of the lay people (normal people).

c). A Manager of a newspaper wishes to estimate the average number of newspapers purchased for a week per household by a community consisting of two villages. Each village consists of a number of lanes. A survey was conducted and the data set is given in the table below.

Village	Lane	Number of Households	The number of news papers purchased for week by each household
1	1	15	2 4 7 1 4 7 3 3 2 2 6 3 1 4 5
	2	17	5 7 2 4 6 5 3 8 5 1 5 1 5 5 8 4 4
	3	13	8 4 7 7 6 3 8 5 8 0 7 5 7
	4	19	2 8 3 7 2 1 3 5 6 1 7 9 3 8 8 4 2 3 5
	5	20	5 3 2 6 9 8 2 8 0 6 4 5 9 9 6 4 6 5 7 3
	Total	84	
2	1	19	0 3 3 0 1 4 3 5 4 2 2 5 5 1 3 5 3 1 1
	2	21	3 1 0 4 0 1 1 5 3 4 4 2 1 4 3 2 4 2 1 3 4
	4	19	0 3 0 1 5 3 3 3 3 2 3 1 3 4 2 1 3 5 5
	5	22	3 2 2 2 4 1 2 5 1 3 3 2 0 3 2 2 2 3 3 1 1 3
	6	19	0 0 1 1 1 4 3 4 2 3 3 4 4 3 3 1 4 0 1
	Total	100	

i. The life styles of people living in different villages are different, but they are approximately the same within the village. What is the suitable sample method and clearly explain the way you would select sample of 50 householders.

ii. Estimate the average number of newspapers purchased per household in a week and compare with average number of newspapers purchased per household in a week by the community (without sampling). Comment your ideas critically.
(Random Number Table is given end of the paper)

(25 marks)

3. "The main objective of QR is to understand the truth underlying the precision of data and come to a conclusion scientifically". According to that explain the following situations.

a). Consider the following records of South Asian Games held in last year participating Sri Lanka, India, Pakistan and etc. (m-minutes, s-seconds)

	Event	Time	Winning Country
I	100m (men)	10.35s	India
	100mX4 (men)	40.58s	India
II	100m (women)	11.88s	Sri Lanka
	100mX4 (women)	46.26s	Sri Lanka
III	400m (men)	45.67s	Sri Lanka
	400mX4 (men)	3m 09.66s	Sri Lanka

i. Comment the time taken for 400m(men) with 100mX4(men)

ii. What is the average time taken by a runner in above three relays? Compare those values with their individual timing. Comment on your conclusions.
(Assume that each runner in individual events ran for the relay too.)

b). Who take an umbrella to protect from rain, make frequently comment that "when taking the umbrella it is not going to rain!". Comment the truth above statement.

c). Following facts were discovered by a survey done on passengers using an elevator.
Mean weight = 50kg
Mode weight = 75kg
The maximum weight the elevator can carry per shift is 750kg, which is expressed in terms of maximum number of passengers.
Calculate and justify the maximum number of passengers, the elevator can carry per shift for a safe journey.

(15 marks)

4. The following data on tourist arrivals have been obtained from the annual repots of Ceylon Tourist Board.

		Tourist arrivals (in thousands)				
	Year	2001	2002	2003	2004	2005
Reason for traveling	Pleasure	377.5	383.6	348.6	354.7	296.9
	Business	21.3	10.8	10.5	15.6	9.8
	Other	8.6	8.8	7	10.7	7.6
	Total	**407.4**	**403.2**	**366.1**	**381**	**314.3**

Use a suitable graph or a chart to represent the above data. Comment on the variation of the tourist arrivals.

(08 marks)

5. a) Suppose that the following two data sets I and II correspond to percentage marks obtained by two groups of students of size twenty each. They are arranged in ascending order of magnitude.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
I	11	11	13	14	18	21	23	28	30	33	37	39	41	43	54	57	79	81	82	87
II	10	22	27	28	28	29	29	29	31	35	38	38	50	52	54	80	82	90	90	95

i. Classify each of the above data sets according to the following table.

Class Boundaries	Frequency I	Frequency II
E: (0.05- 29.5)		
D: (29.5- 39.5)		
C: (39.5- 54.5)		
B: (54.5- 69.5)		
A: (69.5- 99.5)		

ii. Hence calculate the means using (i) raw data and (ii) classified data for each of the data sets. Compare the accuracies and comment critically on the assumption about data.

iii. Find the cumulative frequencies for each group of students and draw their graphs on the same graph paper. Comment on the differences.

b). Percentage marks for eighty course units offered by each of hundred students at the end of three years are stored in a computer. For each student (i) minimum, (ii) maximum and (iii) mean; percentage mark of the eighty course units have been obtained in a printout as in the table given below:

	(i) minimum	(ii) maximum	(iii) mean
1	...	...	...
2	...	...	...
.	...	...	...
.	...	...	...
99	...	...	...
100	...	...	...

Discuss the skewness of each of the data sets of (i) minimum, (ii) maximum and (iii) mean.

(25 marks)

6 a). Following table gives the response of 1000 drivers in different age groups (in years) the road accidents those drivers have encountered.

Number of Accidents	Age Group(Yrs.)				
	18-22	**23-30**	**31-40**	**41-70**	*Total*
0	261	366	186	87	*900*
1	30	28	12	10	*80*
2 or more	9	6	2	3	*20*
Total	*300*	*400*	*200*	*100*	**1000**

i. Comment about the carefulness of the drivers in different age groups?

b) Oral cancer patients from five(5) districts are residing at the Maharagama Cancer Hospital in a certain year. There are nine from Colombo district, one from Galle district, thirteen from Gampaha district, nine from Kalutara district and thirteen from Ratnapura district. Discuss critically the variation of cancer patients in these five districts. You may assume that the population size of Galle, Kalutara and Ratnapura districts are equal while the population size in Gampaha is one and half times and Colombo is twice as that of any of those three districts.

(15 marks)

Random Number Table

33865	04131	78302	22688	79034	01358	61724	98286	97086	21376	09356	09387
52825	93134	21731	93956	85324	68767	49490	11449	98243	37636	64825	43091
24906	13545	90172	31265	81457	93108	99052	61857	33938	86339	63531	77146
33252	81388	28302	18960	00713	24413	36920	03841	48047	04207	50930	84723
07400	81109	34819	80011	17751	03275	92511	70071	08183	72805	94618	46084