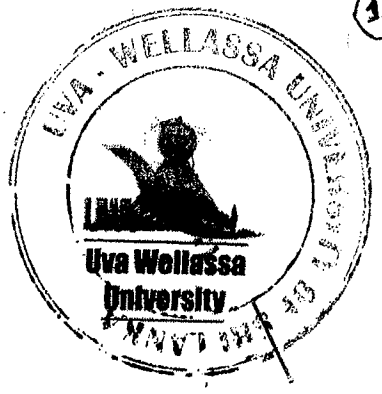


Uva Wellassa University
 Faculty of Science and Technology
 1st Semester Examination- March/April, 2013



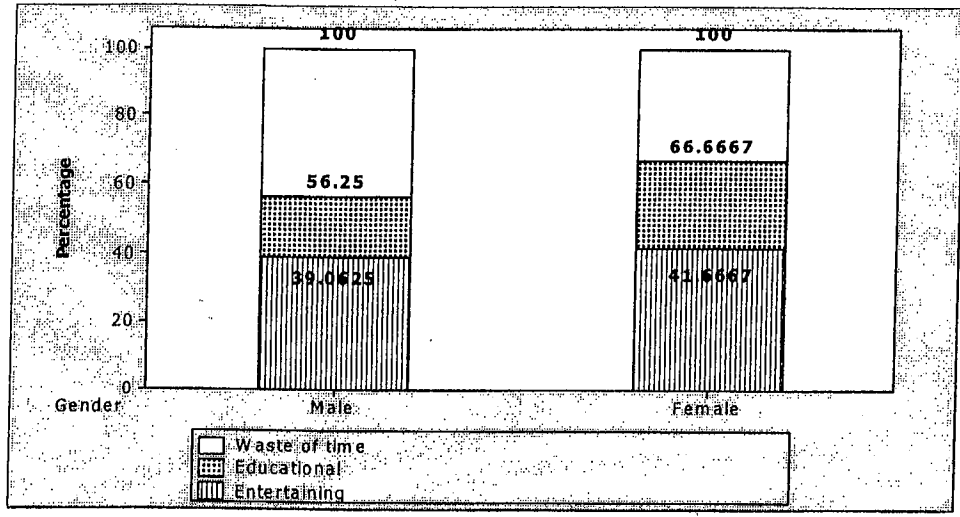
ESS 104-3 Quantitative Reasoning

- a. What are the advantages of diagrammatic presentation of data?
- b. Two hundred randomly selected adults were asked the opinion on watching TV. Only one answer could be chosen from the following: entertaining, educational, or a waste of time. The respondents were categorized by gender. Their responses are given in Table 01.

Table 01: Opinion on Watching TV

Gender	Opinion		
	Entertaining	Educational	Waste of time
Male	44	22	44
Female	36	18	36

- i. Interpret the percentage stack bar chart (Graph 03) which was drawn for the above data.



Graph 03: Opinion on watching TV by gender

- ii. Using the Minitab output of the chi square analysis given below, check whether there is an association between the opinion and the gender. (Chi-square table value = 5.99)

Chi-Square Test: Opinion and Gender				
	Entertaining	Educational	Waste of time	Total
1	50	22	56	128
	51.20	25.60	51.20	
	0.028	0.506	0.450	
2	30	18	24	72
	28.80	14.40	28.80	
	0.050	0.900	0.800	
Total	80	40	80	200

Chi-Sq = 2.734, DF = 2, P-Value = 0.255

(15 marks)

- a. Distinguish between probability sampling techniques and non-probability sampling techniques.
- b. A manufacturing company desires to estimate the total number of man-hours lost in a given month, because of accidents among all employees. The company has 132 labourers, 92 technicians and 27 administrators. Two sampling designs are proposed to select a sample of 20 employees from this company.

A: Draw a random sample of 20 employees using simple random sampling method
 B: Draw a random sample of 20 employees using stratified sampling method.

- i. What is the best suitable sampling design? Give reasons.
- ii. Suggest how this suitable sampling technique could be used to choose the sample of employees.

[15 marks]

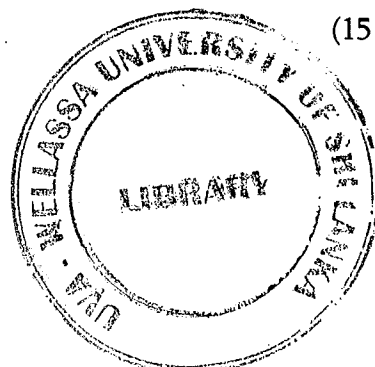
- 3. A random sample of 100 cherry trees in a particular orchard was selected and the yields in kilograms during the year 2001 were recorded for each tree. The data obtained are summarized in the Table 02.

Table 02: The yields in kilograms

Yield (kg)	Number of trees
15-20	3
20-25	10
25-30	12
30-35	14
35-40	16
40-45	18
45-50	20
50-55	7

- a. Draw a less than ogive and a greater than ogive for the above data.
- b. Using the above ogives, estimate the first quartile (Q_1), median (Q_2) and third quartile (Q_3) of the yields (kg).

(15 marks)



Statistical Equations

$$\text{Median} = L + \left[\frac{\left(\frac{N}{2} c \right)}{f} \right] h$$

$$Q_1 = L + \left[\frac{\left(\frac{N}{4} c \right)}{f_{Q_1}} \right] h$$

$$Q_3 = L + \left[\frac{\left(\frac{3N}{4} c \right)}{f_{Q_3}} \right] h$$

$$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}$$

$$r = \frac{\sum_{i=1}^n x_i y_i - n\bar{x}\bar{y}}{\sqrt{(\sum_{i=1}^n x_i^2 - n\bar{x}^2)(\sum_{i=1}^n y_i^2 - n\bar{y}^2)}}$$