NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE
DEPARTMENT OF FOREST RESOURCES AND WILDLIFE MANAGEMENT
BACHELOR OF SCIENCE HONOURS DEGREE
MAIN EXAMINATION

RESEARCH METHODS: EFW 2204

May 2013 **Time Allowed: 3 Hours** **Total Marks: 100**

INSTRUCTIONS TO CANDIDATES:
Answer **QUESTION ONE** and any **THREE** others**.** Each question carries **25 marks**

1. Data in Table 1 show tree height recorded in three woodland types.

Table 1. Tree height (m) in three woodland types.

Baikiaea	*Terminalia*	*Acacia*
19.8	21.9	16.4
16.7	19.8	15.4
17.7	21.0	14.8
18.2	21.4	15.6
20.3	22.1	16.4
15.5	20.8	14.6

(a) State H_0 and H_A hypotheses that could be tested using data in Table 1 **[3 marks]**
(b) Use a one way analysis of variance to test the null hypothesis **[12 marks]**
(c) Briefly describe the role of the variance, standard deviation and standard error in data analysis **[10 marks]**

2. In the semi-arid savanna southwest Zimbabwe, *Acacia* trees are commonly infected by parasitic plants. Forest ecologists believe that the level of parasitic infection varies with host species and host size. You are required to investigate this problem by conducting a scientific inquiry. Explain how you would collect the data to test the hypothesis that parasitic plant infection varies with host species and host size.

3. (a) An experiment was performed to compare the life span of two different grasses (*Panicum maximum* and *Sporobolus pyramidalis*). Twelve plants of *Panicum maximum* and *Sporobolus pyramidalis* were monitored over a complete life cycle. The samples of *Panicum maximum* gave an average life span of 85 months and a sample standard deviation of 4, while the samples of *Sporobolus pyramidalis* gave an average of 81 and a sample standard deviation of 5. Can we conclude at the 0.05 level of significance that the life span of *Panicum maximum* is similar to that of *Sporobolus pyramidalis*? (Assume the populations to be approximately normal with equal variances) **[10 marks]**

(b) Describe three techniques used in data transformation **[15 marks]**

4. An ecologist assessed the attitudes of livestock owners towards three carnivores. The responses are recorded in Table 2.

Table 2. Livestock owners' attitudes towards carnivores.

Attitude	Carnivore		
	Lion	Leopard	Spotted hyaena
Negative	30	15	8
Moderate	10	20	25
Positive	8	25	50

(a) Test whether the attitudes of livestock owners towards the three carnivores are the same. **[10 marks]**

(b) Discuss any three methods of administering questionnaires, citing their advantages and disadvantages. **[15 marks]**

5. Explain how you would measure tree density using the following sampling methods:
   (a) Belt transects **[8 marks]**
   (b) Nearest-neighbour method **[8 marks]**
   (c) Point-centred quarter method **[9 marks]**

6. Giving examples in each case, describe four types of sampling techniques commonly used when collecting data.

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