CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTER OF SCIENCE (ANIMAL NUTRITION)

ANSC 713: STATISTICAL COMPUTING IN ANIMAL NUTRITION

STREAMS: MSC (ANSC) **TIME: 3 HOURS**

DAY/DATE: WEDNESDAY 11/4/2018 **2.30 P.M. – 5.30 P.M.**

INSTRUCTION:

- **(i) Attempt ALL questions**
- **(ii) You are expected to use your laptop to do this examination using the program R.**
- **(iii) Save your results in as a text file. Indicate your Adm. No. on the text file**

1. Use the data provided below to do the summary analyses indicated below in R.

[15 marks]

Ration A	10	7	20	14	14	12	10	23	17	20	14	13
Ration B	11	17	21	11	16	14	17	17	19	21	7	13

(a) calculate the sample means and variances for the two rations

(b) use a boxplot to compare the distribution of the two samples

(c) do a t-test to compare the effects of ration A and B on yield

2. Use the Wilcoxon Rank Sum test to test the following hypotheses: [15 marks]

H_o: The two populations are identical $(\Delta = 0)$

H_a:Population 1 is shifted to the right of population 2$(\Delta < 0)$

Treatment A	4.3	4.6	4.7	5.1	5.3	5.3	5.8
Treatment B	3.5	3.8	3.7	3.9	4.4	4.7	5.2

Use = .05

3. An experiment was conducted to determine the effect of a calcium supplement on egg shell strength. 10 layers at the same stage of laying were used in the experiment. The basal feed was maintained constant throughout the experiment in terms of quality and quantity fed per bird. Egg shell strength (expressed as the average pressure required to break 10 eggs per bird) was recorded before and two weeks after exposing the birds to the supplement is shown below.

Before	2.86	7.74	5.49	3.09	1.44	9.39	11.40	1.86	6.71	6.42
After	6.11	4.02	8.04	3.29	0.77	6.99	10.19	2.09	11.40	10.70

Conduct the appropriate test to determine whether the supplement increased egg shell strength. [15 marks]

4. An experiment was conducted to determine effects of 4 incentive plans i.e. A, B, C and D, on productivity. The data presented below shows the number of output units per personnel under the different incentives. Use the data to test whether there is evidence that the mean output associated with the four incentive plans was different. Use $\alpha = .05$

	Incentive plan			
Rep	A	B	C	D
1	422	521	437	582
2	431	545	422	639
3	784	600	473	735
4	711	406	478	800
5	641	563	397	853
6	709	361	944	748
7	344	387	394	622
8	599	700	890	514
9	511	348	488	714
10	381	944	521	627

[15 marks]
