CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN ANIMAL SCIENCE

ANSC 372: DESIGN AND ANALYSIS OF ANIMAL EXPERIMENTS

STREAMS: BSC (ANSC) Y3S2 **TIME: 2 HOURS**

DAY/DATE: MONDAY 16/4/2018 **2.30 P.M. – 4.30 P.M.**

INSTRUCTION:

1. **This exam has two sections A and B. attempt ALL questions in section A and any TWO questions in section B**
2. **Show your working**
3. **Use of mobile phones as calculators is NOT allowed**

SECTION A: ATTEMPT ALL QUESTIONS (30 MARKS)

1. The following data relates to birth weight in lambs. It is known that birth weight in lambs is normally distributed. Use the data to construct a 95% confidence interval for the population mean.

2.5	5.0	3.0	4.0	2.5	3.5	3.0	4.0	5.0	4.0
3.5	3.5	3.0	2.5	3.0	3.0	3.0	4.5	4.0	3.5
4.5	3.5	2.5	5.0	4.5	4.0	4.0	3.0	2.5	3.5

[6 marks]

2. The sample mean from a sample of size 50 was estimated to be 650. Using $\alpha = .05,$ test the hypothesis.

$H_0: \mu \leq 650$

$H_A: \mu > 650$ [6 marks]

3. Use the data provided to answer the questions below.

501.4	498.0	498.6	499.2	501.4	509.5	494.9	498.6	497.6	495.2
505.5	505.1	499.8	502.4	497.0	504.3	499.7	497.9	496.5	498.9
504.9	503.2	503.0	502.6	496.8	498.2	500.1	497.9	502.2	503.2

(a) Construct a 95% confidence interval for the population variance.

(b) Test the following hypothesis. Use $\alpha = .05$

$H_0: \sigma^2 \geq 500.453$

$H_0: \sigma^2 < 500.453$ [12 marks]

4. Use the data provided to answer the question below.

Sample 1	Sample 2
$n_1 = 12$	$n_2 = 12$
$\bar{y}_1 = 26.58$	$\bar{y}_2 = 39.67$
$s_1 = 14.36$	$s_2 = 13.86$

Test the following hypothesis. Use $\alpha = .05$

$H_0: \mu_1 - \mu_2 \geq 0$

$H_0: \mu_1 - \mu_2 < 0$ [6 marks]

SECTION B: ATTEMPT ANY TWO QUESTIONS

5. A study was conducted to determine the efficacy of a drug in treating intestinal worms. Data was collected on the number of worm eggs in fecal samples before and after treatment. Use the data provided to perform the appropriate statistical test.

Before	23	8	15	10	2	10	11	2	7	6
After	6	4	8	3	1	7	10	2	11	10

Is there significant evidence from the sample data that the drug was effective in treating worms? Use $\alpha = .05$ [20 marks]

6. A study was conducted to compare two drugs for the control of external parasites. Each of the drugs was applied to cows which were heavily infected with ticks. The efficacy of the drugs was determined as the number of ticks dead after two days from exposure to the drugs. The number of ticks dead for each drug are presented below.

Drug A	8	8	7	5	9	10	10	10
Drug B	9	7	6	7	13	10	11	13

Using the appropriate Wilcoxon Sum Rank Test, determine using $\alpha = .05$whether there is sufficient evidence that drug A is less effective compared to drug B. [20 marks]

7. Chuka University has four machines for testing pH. A student was interested to compare the accuracy of the four machines to decide which machine to use for his experiments. In the comparison test, the student randomly tested 6 samples of a compound with known pH with each of the machines. Data was recorded on the difference between the machine pH reading and the actual known pH of the compound and is provided below.

	Sample					
Machine	1	2	3	4	5	6
A	-.307	-.294	.079	.019	-.136	-.324
B	-.176	.125	-.013	.082	.091	.459
C	.137	-.063	.240	-.050	.318	.154
D	-.042	.690	.210	.166	.219	.407

Conduct an ANOVA test to determine whether there is evidence from the data that the mean differences between the four machines are different. $\alpha = .05$. [20 marks]
