AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES

ACP202 BOIMETRY
END OF SEMESTER EXAMINATIONS

NOVEMBER 2019

LECTURER: DR. CHITEKA

DURATION: 3 HOURS

INSTRUCTIONS

Answer Any 5 Questions

1. The following grouped data represent the dressed carcass mass in grams for broiler chicken at 5 weeks of age. Below is a frequency table showing the number of carcasses selected at random from a recent batch. Of the day-old chicks that were used 70% were purchased from Sykes Hybrid Co and the rest were from Crest Breeders Ltd.

Category	Frequency
800 < 1000	10
1000 < 1200	25
1200 < 1400	50
1400 < 1600	28
1600 < 1800	11
1800 < 2000	7

1a. List four terms that can be used to describe the data presented in the table above. [2]

1b. Determine the sample size. [1]

1c. Determine the probability a randomly picked carcass will fall in each category (give the values to 2 decimal places) [6]

1d. A carcass is selected at random from a box and the person prefers carcasses that are at least 1400g. What is the probability of picking a Caracas of the preferred mass (use two decimal places)? [3]

1e. Determine the probability that a Carcass selected at random from a box will weigh at least 1200g and is derived from Crest Breeders. [3]

1f. Discuss the approach to probability that is applied in 1c and explain the limitations of this table in determining the probability of observing an individual between two values in the data set. [5]

2. The following data represent the live mass of cattle in kg that were randomly sampled from two beef herds, one from Mr Zing and the other for Mrs Jiaquinta. The two herds have approximately the same population size.

Owner									
Mr Zing	125	140	300	150	350	160	200	100	390
Mrs Jiaquinta	180	250	300	280	325	270	150	400	

2a. Determine the mean, the mode and the median and the variance for each data set above and clearly label which herd the data is derived from. **[6]**

2b. You are to purchase cattle from one of the farms for resale to an abattoir and they prefer animals with a live mass of at least 250 kg or more.

i) Select an appropriate numerical descriptive statistic from what you have calculated and use it to decide which herd from which to go and buy animals for resale and give the reason for using that statistic. **[4]**

ii) Select and calculate any other numerical descriptive statistic and use it to decide which herd is more variable in live mass of the two beef herds. Give a reason for the choice of statistic for your response. **[10]**

3a. A farmer sampled 36 broiler chickens from his flock and weighed each one in order to determine their readiness for slaughter. He converted the live mass to a dressed carcass mass and found that the mean dressed carcass mass would be 1.4kg (S=0.3). Make an inference about the expected mean live mass of birds of the flock on this date and discuss the value and limitations of this inference. **[4]**

3b. Determine the 95% confidence interval for the mean dressed carcass for the birds in the flock an interpret it. **[5]**

3c. If the long-term mean dressed carcass mass for this farm is 1.6kg, test the hypothesis that the sample mean is not different from the long-term average. (Set alpha =0.05) **[8]**

3d. Explain what the standard deviation of the mean tells you about the data set. **[3]**

4a Discuss the principles of sampling. **[6]**

4b Identify four probability sampling methods and discuss how each one is applied giving examples of appropriate sampling tasks where each one is applicable. **[12]**

5a. The proportions of students from different nations who enroll at Africa University over the past 15 years was found to average out at 60% Zimbabwean, 20% were those from the SADC region and the remainder were from countries outside SADC. A random sample of students selected in the August 2018 intake had the following distribution: 40 Zimbabwean, 35 from the SADC region and 25 from outside the SADC region. Does this intake conform to the long-term percentage distribution based on this classification? Show all the steps clearly.

[8]

5b. An extension officer studied the on-farm performance of the cowpea variety Vita-4 at two different altitudes. He sampled 16 smallholder farms and found a mean yield of 1.4t/ha and a variance of 0.4 in one district. In the other district he sampled 10 farms and observed a mean yield of 0.950t/ha with a variance of 0.3. Is there a difference in the performance of this variety in the two Districts? (Set alpha = 0.05.) **[10]**

5c. What does the standard deviation tell you about the data from which it is calculated? **[2]**

6. The following data represent the flower colour for a sample of plants randomly selected from a segregating population of plants of the morning glory plant species of the same species. The selected plants are numbered from 1 to 25 as shown below.

blue	red	purple	red	red	yellow	Red	pink	pink	yellow	red	red	blue
1	2	3	4	5	6	7	8	9	10	11	12	13
purple	purple	white	pink	white	yellow	purple	red	red	blue	purple	pink	

14	15	16	17	18	19	20	21	22	23	24	25	

6a. Write down two terms that can be used to describe this data and explain why you selected each of the terms that you selected. **[2]**

6b. Determine the mean, the mode and the median of this data set. **[6]**

6d. The data below represent the plant height in cm of a random sample of wheat plants in a segregating population of a cross made between two genotypes that differ in plant height.

91	76	93	74	55	86	77	88	49	100	111	92	76	64
	85	69	87	48	99	70	45	102	73	124	65		

i) Draw up a box plot to represent these data. **[6]**

ii) Using the box plot, make some statements to characterize the population from which the sample was drawn. **[6]**

END OF EXAMINATION PAPER