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MAIN EXAMINATION

JANUARY – APRIL 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCES (BIOLOGY)

SCHOOL FOCUSED PROGRAMME

BIO 300: PRINCIPLES OF BIOSTATISTICS AND DATA ANALYSIS

Date: April 2015	**Duration: 2 Hours**
Instructions: Answer Question ONE and any other TWO Questions.	

Q1. a) Differentiate between the following.

i) Measurer of dispersion and measure of central tendency. **(2 marks)**

ii) One tailed and two tailed tests of significance. **(2 marks)**

iii) Type I and Type II errors. **(2 marks)**

iv) Permutations and combinations in probability statistics. **(2 marks)**

v) A Population and a sample. **(2 marks)**

b) Given the data shown in this table;

X	1	1	2	3	4	6
F	4	14	30	31	15	2

Calculate

i) The mean **(3 marks)**
ii) The mode **(2 marks)**
iii) The median **(2 marks)**

c) In how many ways can twelve different amino acids be arranged into a polypeptide chain of five amino acids? **(3 marks)**

d) A normally distributed population of bread weights has a mean of 63.5g and a standard deviation of 12.2g.

i) What proportion of this population is larger that 78.0g? **(2 marks)**

ii) What proportion of the population is less than 77.0g?

(2 marks)

iii) If these are 1000 weights in the population, how many of them are larger than 78.0g?

(2 marks)

iv) What is the probability of choosing at random from this population a weight smaller than 41.0g?

(2 marks)

e) A sample of size eighteen, has a mean of 13.55 cm and a variance of $6.4512cm^2$. Calculate the 95% confidence interval for the population mean.

(2 marks)

Q2. A study is conducted to compare the number of car accidents with the gender of the driver. The results are given in the following table.

	Accidents			
	0	1	2	3 or mor
Women:	200	300	150	50
Men:	100	250	100	50

At 95% confidence level, test wether there is a difference in the proportions of car accidents based on the gender of the driver.

(20 marks)

Q3. A study was conducted to determine the relationship between a person's height and shoe size. The following set of data pairs is obtained and listed in the form (height in inches, shoe size);

(66, 9); (63, 7); (67, 8.5); (71, 9); (62, 6)'
(65, 8.5); (72, 12); (68, 10.5); (60, 5.5); (66, 8)

Determine if there is any relationship between a person's height and shoe size based on this data.

(20 marks)

Q4. Consider the following set of data on systolic blood pressure in mm of mercury.

121, 125, 128, 134, 136, 138, 139, 141, 144, 145, 149, 151

a) Calculate the following measures
   i) Mean
   ii) Variance
   iii) Standard deviation
   iv) Coefficient of variation
   v) Standard error.

Use the working formula for the standard deviation and variance.

(15 marks)

b) Attach a 99% confidence limit to the mean of this data and set the confidence intervals.

(5 marks)

Q5. a) State the assumptions of ANOVA.

(5 marks)

b) Compare a t distribution with a normal distribution curve.

(5 marks)

c) Listed are body temperature (measured in ^{0}C) of twenty five intertidal crabs placed in air at 24.3^{0}C:

25.8, 26.1, 22.9, 25.1, 27.3, 24.0
24.6, 24.5, 23.9, 26.2, 24.3, 24.6
23.3, 25.5, 28.1, 24.8, 23.5, 26.3, 25.4,
25.5, 23.9, 27.0, 24.8, 22.9, 25.4

Test the hypothesis to establish if this sample came from a population with a mean of 24.^{0}C.

(10 marks)

END