MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACEUTICAL SCIENCES WITH INFORMATION TECHNOLOGY

MAIN CAMPUS

PMT 318: BIOSTATISTICS AND BIOMETRICS

Date: 8th March, 2018   Time: 3.30 - 6.30pm

INSTRUCTIONS:

- Answer ALL Questions in Section A
- Answer Question 6 and any other in Section B

MASENO UNIVERSITY
2017/2018 ACADEMIC YEAR
THIRD YEAR FIRST SEMESTER EXAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL LABORATOTY SCIENCES, MEDICAL BIOTECHNOLOGY AND PHARMACEUTICAL SCIENCES WITH IT

Instructions
1. Answer ALL questions in Section A.
2. Answer TWO questions in Section B. Question 6 is compulsory.
3. Refer to the appended formulae and tables of critical values.

Section A —Answer ALL questions. Each question carries 10 marks

Q1: Distinguish between the following pairs of terms
- a) Population and sample
- b) Type I error and Type II error
- c) Accuracy and precision
- d) Skewness and Kurtosis

Q2: Define the following terms.
- a) Alpha
- b) Confidence interval
- **c) P value**
- **d) Class interval**
- **e) Coefficient of determination**

Q3: Calculate the mean, median, range, and variance for the following array of data.

66, 115, 54, 88, 82, 115, 176, 98, 142, 78, 101, 134, 158, 219, 60

Q4: Briefly describe the FOUR levels of measurement.

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Q1: Distinguish between the following pairs of terms
   a) Population and sample
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Q3: Calculate the mean, median, range, and variance for the following array of data.

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Q4: Briefly describe the FOUR levels of measurement.

Section B —Answer Question 6 and ANY one of the other questions. Each question carries 15 marks

Q6: The following data sets represent dehydroepiandrosterone (DHEAS) sulfate values for women with and those without asthma. Determine whether there is sufficient evidence to conclude there is significant difference in the levels of DHEAS between women with and those without asthma.

Without: 20.6, 37.8, 77.0, 19.3, 35.0, 146.1, 166.0, 96.6, 24.6, 53.5

With: 87.5, 111.5, 143.8, 25.2, 68.2, 136.1, 89.3, 96.9, 144.3, 97.5, 82.8

Q7: A study was conducted to determine the effectiveness of varying amounts of vitamin C in reducing the number of common colds. The table below summarizes data from a survey of 450 people. Use the information in the table to determine whether there is sufficient evidence to conclude that there is an association between effectiveness of amount of vitamin C and number of common colds.

	None	500 mg	1000 mg
No colds	57	26	17
At least one cold	223	84	43

Q8: Critically evaluate differences between probability and non-probability samples techniques.

Formulae

$$X^2 = \sum \frac{(O-E)^2}{E}$$

$$t = \frac{\bar{X} - \mu}{SE}$$

$$t_{obtained} = \frac{\bar{D}}{SE_D}$$

$$c = \bar{y} - b * \bar{x}$$

$$t = \frac{\bar{y}_A - \bar{y}_B}{se_{diff}}$$

$$se_{diff} = \sqrt{\left(\frac{S_A^2}{n_A} + \frac{S_B^2}{n_B}\right)}$$

$$F = \frac{MSB}{MSE}$$

$$r = \frac{\sum Y_d Z_d}{\sqrt{\sum Y_d^2 \times \sum Z_d^2}}$$

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

$$r_s = 1 - \left(\frac{6 \sum d^2}{n(n^2 - 1)}\right)$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$