



## SCHOOL OF PROFESSIONAL STUDIES

### BACHELOR OF ARTS IN COUNSELLING PSYCHOLOGY

UNIT CODE/NAME: BCP 225: APPLIED STATISTICS IN PSYCHOLOGY

January – April 2018/2019 End Semester Exam - Time: 2 Hours

**Instructions:** Answer Question ONE (Compulsory) and any other TWO questions.

#### QUESTION ONE

(a) The table below shows how students doing introduction to probability and statistics class performed in an examination in the year 2018 September – December 2018 Semester.

Class	20 -29	30 - 39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	2	4	3	35	15	20	11	10

**Required:** calculate:

- (i) The modal class (3 marks)
  - (ii) Median (3 marks)
  - (iii) Percentile range (3 marks)
  - (iv) Standard deviation (3 marks)
  - (v) Interquartile range (IQ) (3 marks)
  - (vi) Mean average deviation (3 marks)
- (b) There are three categories of summary measures, namely, measures of central tendency, measures of variation and measures of normality.

**Required;** In view of the statement above, measures of central tendency include, mode, mean and median. Clearly describe what is meant by the term mode mean and median stating the advantages and disadvantages of each and where it is appropriate to us them. (12 marks)

## QUESTION TWO

In a manufacturing plant, a day's total production equals to 9,000 items. Three machines with a daily production capacity of 4,000 units are available in a factory and the probability that an item is defective is 1%, 2 % or 4% for machine A, B and C respectively. On a given day, 4,000 items were produced on machine A, 4,000 items on machine B and 1,000 items were produced on machine C. One item is selected at random and is found to be defective.

**Required:**

What is the probability that the defective machine is;

- (i) Machine A (4 marks)
- (ii) Machine B (4 marks)
- (iii) Machine C (4 marks)
- (iv) Summarize the importance of Bayes's theorem (3 marks)

## QUESTION THREE

- (a) Differentiate between the following terms as used in probability and statistics.
- (i) Null hypothesis and alternative hypothesis. (4 marks)
  - (ii) Type one and type two errors. (4 marks)

- (b) A certain NGO carried out a survey in a certain community in order to establish the average at which the girls are married. The results of the survey indicated that the marriage age for the girls is 19 years. In order to establish the validity of the mean marital age, a sample of 50 women was interviewed and the average age indicated that they got married at the age of 16 years. However, the different ages at which they were married differed with the standard deviation of 2.1 years. The sample data indicates that the marital age is less than 19 years. Is this conclusion true or not?

**Required:**

Conduct a statistical test to either support the above conclusion drawn from the sample statistics i.e. the marriage age is less than 19 years, use a level of significance of 5%.

(7 marks)

## QUESTION FOUR

- (a) The quality department of a wire manufacturing company periodically selects a sample of wire specimens in order to test for breaking strength. Past experience has shown that the breaking strengths of a certain type of wire are normally distributed with standard deviation of 200 kg. A random sample of 64 specimens gave a mean of 6200 kg.

**Required:**

Calculate the population mean at 95% level of confidence.

(8 marks)

- (b) A sample of 600 accounts was taken to test the accuracy of posting and balancing of accounts where in 45 mistakes were found.