



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY**

PSY/PHD/801: STATISTICS AND COMPUTER APPLICATION

DATE: WEDNESDAY 1ST DECEMBER 2010

TIME: 9.00A.M. - 12.00 P.M.

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER 2 QUESTIONS

QUESTION ONE – (30 marks)

A. Say in each of the following cases whether the italicized group is a **sample or a population**.

- i. *Ten customers* taken as representative of shoppers.
- ii. *Eleven members* of a football team whose hotel requirements need to be known by their manager.
- iii. The ability of a teacher to teach form IV mathematics is assessed by examining the work of *all his or her form IV pupils*.
- iv. The ability of a teacher is assessed by examining the work of *all of his or her form IV pupils*.
- v. The ability of a teacher is assessed by examining the work of *some of his or her form pupils*.
- vi. In order to investigate the existence of any link between eating carrots and seeing well at night, a doctor looks at *his or her patients' records*.

(3 marks)

B. Indicate whether each of the following statements represents a population, sample, statistic or parameter.

- i. In 2005 there were 413 fatal accidents reported on the Kenyan roads.
- ii. Studies have been conducted recently on the flight patterns of the flamingoes.

- iii. Hary black had 50 introductory Psychology students sign up to participate in his study.
- iv. Hary Black found that 30% of the students who signed up for his hypnosis experiment could potray a trance like state by mere suggestion and not hypnosis.

(4 marks)

C. Indicate whether the variables used in the following studies are **continuous or discrete** and identify **the scale of measurement (nominal, Ordinal, Interval or Ratio)** they represent.

- i. The host of a large dinner party had predetermined the sitting arrangement of her guests. To ensure that each person knew where to sit *she placed a number on each plate and then gave her quests a number that corresponds to a particular seat.*
- ii. An environmental psychologist was interested in determining which of two signs was more effective in inducing people to walk around a construction site. To make his assessment he constructed two signs, A and B, and pinned each one in front of the construction site on alternate days for six days. *He then recorded the number of people who walked through the construction site each day.* He found that 54 people walked through the construction site when sign A was up but only 21 people did when sign B was up.
- iii. A social Psychologist was interested in determining if obese people would eat more pudding if it were sweetened with sugar as opposed to saccharin. To determine whether the subjects are more of the sugar-sweetened versus saccharin-sweetened pudding, *he weighed the bowl containing the pudding after making it available to the subjects.*
- iv. A biofeedback researcher used temperature biofeedback to treat a client. *He measured the amount of temperature change that the clie4nt could induce in his fingertips.*

- v. A researcher was interested in determining whether suggestibility affects reaction time. *He first measured the amount of time it took 50 students to depress a telegraph key 100 times.* Then he gave the students a glass of orange juice and told them it contained a drug (it did not) that would allow them to depress the telegraph key more rapidly. *The researcher measured the difference in the amount of time required to depress the telegraph key 100 times before and after the suggestion.* **(5 marks)**
- D.
- i. Describe the uses of descriptive and inferential statistics. **(3 marks)**
 - ii. Describe what a symmetric distribution is **(2 marks)**
 - iii. What is a scatter plot? What are its functions **(2 marks)**
 - iv. Draw (sketch) a scatter plots representing curvilinear relationships, positive, negative and zero correlations **(2 marks)**
- E. The following scores were obtained by a college sophomore class on an English exam:
- | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|
| 60 | 94 | 82 | 72 | 57 | 92 | 75 | 85 | 77 | 91 | 75 |
| 72 | 85 | 64 | 78 | 75 | 62 | 49 | 70 | 94 | 72 | 84 |
| 55 | 90 | 88 | 81 | 64 | 91 | 79 | 66 | 68 | 67 | 74 |
| 45 | 76 | 73 | 68 | 85 | 73 | 83 | 85 | 71 | 87 | 57 |
| 82 | 78 | 68 | 70 | 71 | 78 | 69 | 98 | 61 | 65 | 83 |
| 84 | 69 | 77 | 81 | 87 | 79 | 64 | 72 | 55 | 76 | 68 |
| 93 | 56 | 67 | 71 | 83 | 72 | 82 | 78 | 62 | 82 | 49 |
| 63 | 73 | 89 | 78 | 81 | 93 | 72 | 76 | 73 | 90 | 76 |
- a) Construct a grouped frequency distribution of scores having a class interval of 5 ($ci = 5$), showing apparent limits, really limits, midpoints, tallies, frequencies, the less than cumulative frequencies and the %age less than cumulative frequencies. **(5 marks)**
 - b) Construct a histogram of the frequency distribution in part a). **(3 marks)**
 - c) Describe the shape of the distribution (Is it symmetrical or skewed, if skewed what type of skewness is it?) **(1 mark)**

QUESTION TWO – (10 marks)

A clinical psychologist was interested in the relationship between number of hours of daylight and depression. The following data were collected from ten female subjects.

Subject	1	2	3	4	5	6	7	8	9	10
Daylight in hours	10.1	11.3	9.8	10.5	10.9	11.8	11.1	9.4	11.6	9.6
Depression score	14	12	17	15	10	6	13	15	10	16

- What is the appropriate correlational technique and why?
- Compute the correlation between the hours of daylight and the level of depression.
- Test for significance the correlation obtained b.
- What does the correlation say about the relationship between depression and daylight?
- Compute the coefficient of determination (r^2) and interpret what it means.

QUESTION THREE (10 marks)

Given the following sets of scores from 12 individuals on sibling rivalry and social status strivings

	Score on Sibling rivalry	Score on Social status striving
A	82	42
B	92	46
C	87	39
D	40	37
E	116	65
F	113	88
G	111	86
H	83	56
I	85	62
J	126	92
K	106	54
L	117	81

- Compute the kendall's T for the data.
- Test for significance the correlation obtained in (a)

QUESTION FOUR – (10 Marks)

In a test administered to 400 candidates, the mean was found to be 60 and standard deviation 5.

Assuming the scores were normally distributed, answer the following questions:

- a. What proportion of the scores fall between the scores 55 and 65?
- b. What scores cut off the middle 50% of the class?
- c. 20 students on this test failed, what was the pass mark on the test?
- d. What was the score of the student at P60
- e. Calculate the percentile rank of the student with the score 50 on this test.
- f. In what stanine would a student with a score of 40 fall?

QUESTION FIVE – 10 Marks

- a. Describe briefly the steps involved in hypothesis testing.
- b. In hypothesis testing what is meant by :
 - i. Significance level
 - ii. Critical values
 - iii. Rejection region
- c. Differentiate between type I error and type II error, show for each one , how the researcher can endeavor to minimize it.
- d. What is meant by “the power of a statistical test”
- e. Describe the assumptions of a parametric test of significance.
