



(The University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

KISUMU CAMPUS

2015/2016 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

DOCTOR OF PHILOSOPHY IN

BUSINESS ADMINISTRATION

COURSE CODE: PBA 902

COURSE TITLE: ADVANCED BUSINESS RESEARCH STATISTICS

DATE: JUNE 2016 TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES

Answer question **One** and any other **Three** questions

QUESTION ONE (20)

a) Explain the meaning of the following terms as used in statistics.

- i) Random variable 2mks
- ii) Qualitative variable 2mks
- iii) Quantitative variable 2mks
- iv) Discrete variable 2mks
- v) Continuous variable 2mks

b) Machines A and B turn out respectively 10% and 90% of the total production of a certain type of an article. The probability that machine A turns out a defective item is 0.01 and the probability that machine B turns out a defective item is 0.05.

- i) what is the probability that an article taken at random from the production line is defective 5mks
- ii) what is the probability that an article taken at random from the production line was made by machine A, given that it is defective 5mks

QUESTION TWO (20 MKS)

a) Suppose that 30% of companies in a certain sector of the economy have announced plans to expand in the next year (and other 70% will not). In a sample of twenty companies chosen at random drawn from this population, find the probability that the number of companies which have announced plans to expand in the next year will be;

- i) precisely three 4mks
- ii) fewer than three 3mks
- iii) precisely five 3mks

b) The volume of water in commercially supplied fresh drinking water containers is approximately normally distributed with mean 70 litres and standard deviation 0.75 litres. Estimate the proportion of containers likely to contain

- i) in excess of 70.9 litres 4mks
- ii) at most 68.2 litres 3mks
- iii) less than 70.5 litres 3mks

QUESTION THREE (20MKS)

a) The supreme restaurant chain claims that the waiting time of customers for service is normally distributed with a mean of 3.5 minutes and a standard deviation of 1.3 minutes. The quality assurance department found in a sample of 40 customers at the Imperial hotel in Kisumu branch that the mean waiting time was 4.8 minutes. Test the claim on the mean waiting time at the $\alpha=0.05$ significance level.

(10mks)

b) The following data represents the change (in ml) in the amount of carbon monoxide transfer (an indicator of improved lung function) in smokers with chickenpox over a one week period:

3,3,2,2,4,5,4,6 . if the data are normally distributed with unknown standard deviation, use a significance level of $\alpha=0.05$ to test the hypothesis that the true mean change exceeds 3. (10mks)

QUESTION FOUR

The personnel department of company A wishes to compare the efficiency of workers who are native born with those who are foreign born. Company records show that the standard deviations for outputs of native born and foreign born workers are 8 and 10, respectively. The company takes a sample of 32 native born workers with a mean of 50 units per worker, and a sample of 38 foreign born workers with a mean of 40 units per worker. Test to determine which group is more productive at $\alpha=0.01$ (20 MKS)

QUESTION FIVE (20 MKS)

Suppose the national transportation board (NTSB) wants to examine the safety of compact cars, midsize cars, and full size cars. It collects a sample of three for each of the treatments (car types). Using the hypothetical data provided below, perform an ANOVA test to show whether the mean pressure supplied to the driver's head during a crash test is equal for each type of car. Use $\alpha=5\%$

Compact cars	midsize cars	fullsize cars
643	469	484
655	427	456
702	525	402

20mks

QUESTION SIX (20 MKS)

In a consumer marketing, a common problem that many marketing manager faces is the selection of appropriate colors for package design. Assume that a marketing manager wishes to compare five different colors of package design. He is interested in knowing which of the five is the most preferred one so that it can be introduced in the market. A random sample of 400 consumers reveals the following.

Color package preference by consumers

Red	70
Blue	106
Green	80
Pink	70
Orange	74

Do the consumer preferences for package colors show any significant difference? Use $\alpha=0.05$

20mks