

 W1-2-60-1-6

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

 **UNIVERSITY EXAMINATIONS 2015/2016**

**YEAR II SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF PURCHASING AND SUPPLIES MANAGEMENT**

**HPS 2205: QUANTITATIVE METHODS I**

**DATE: AUGUST 2016 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE**

Sampling methods are widely used for the collection of statistical data in Industry.

Explain the following, illustrate your answers with practical examples;

1. Simple random sampling [5 marks]
2. Stratification [5 marks]
3. Quota sampling [5 marks]
4. Sample frame [5 marks]
5. Cluster sampling [5 marks]
6. Systematic sampling [5 marks]

**QUESTION TWO**

An analysis of access time to a computer disc system was made during the running of a particular computer program, which utilized disc file handling facilities. The results of the 120 access times were as follows;

 Access time Frequency

 30 but less than 35 17

 35 but less than 40 24

 40 but less than 45 19

 45 but less than 50 28

 50 but less than 55 19

 55 but less than 60 13

**Required:**

1. Determine the mean access time for this program. [9 marks]
2. Determine the standard deviation of the access time for this program. [8 marks]
3. Intepret for your supervisor, who is not familiar with grouped data what the results in parts (i) and two mean. [4 marks]

**QUESTION THREE**

1. Briefly explain two commercial, industrial or business uses of index numbers.
2. A cost accountant has derived the following information about weekly (W) wage rates and the number of people employed € in the factories of a large chemical company;

Technical July 1979 July 1980 July 1981

Group of Employees W E W E W E

 Q 60 5 79 4 80 4

 R 60 2 65 3 70 3

 S 70 2 85 2 90 1

 T 90 1 110 1 120 2

1. Calculate a Laspeyers (base weights) all – items index number for July 1980 basic weekly wage rates, with July 1979 = 100
2. Calculate a Paasche (current weights) all – times index number for the July 1981 basic weekly wage rates with July 1979 = 100.
3. Briefly compare your index numbers for the company with the official government figures for the chemical and Allied Industries which are given below;

 Yearly annual Averages :-

 1979 1980 1981

 Weekly wage rates 156.3 187.4 203.4

 (July 1976 = 100)

**QUESTION FOUR**

A chocolate manufacturer products two kinds of chocolate bar, X and Y which are made in three stages, blending, baking and packaging. The time on minutes required for each box of chocolate bars is as follows;

 Blending Baking Packaging

 X 3 5 1

 Y 1 4 3

The blending and packaging equipment is available for 15 machine hours and baking equipment is available for 30 machine hours. The machine time may be used for either X or Y all times if is available. All production may be sold.

You are required to:

1. State the equations/inequalities which describe the production conditions.
2. Draw a graph of these equations/inequalities; clearly identifying the feasible region.

**QUESTION FIVE**

A company has a large number of typists. A survey shows that 30 can use a word processor, 25 are audio typists and 28 are short-hand writers of the typists who are short hand writers, 3 are audio typists and can use a word processor, 5 are audio-typists and cannot use a word processor, 9 can use a word processor but are not audio-typists, 6 of the audio-typists can use a word processor but are nor shorthand writers.

1. Represent the information on a Venn diagram. [5 marks]
2. How many typists were involved in the survey? [10 marks]
3. How many typists have only one skill? [5 marks]

**QUESTION SIX**

1. A company manufactures two products X and Y by means of two processes A and B. The maximum capacity of process A is 1750 hours and of process B 4000 hours. Each must of product X requires 3 hours in A and 2 hours in B while each unit product Y requires 1 hour in A and 4 in B. Use the algebraic method to calculate how many units of products X and Y are produced if the maximum capacity available is utilized.

Demonstrate the situation graphically. [10 marks]

1. Solve the simultaneous equations below;

 3x – y + z = 5

 2x + 2y + 3z = 4

 x + 3y – z = 11 [10 marks]