GARISSA UNIVERSITY

UNIVERSITY EXAMINATION 2017/2018 ACADEMIC YEAR <u>ONE</u> <u>FIRST</u> SEMESTER EXAMINATION

SCHOOL OF EDUCATION, ARTS AND SOCIAL SCIENCES

FOR THE DEGREE OF BACHELOR OF EDUCATION (ARTS)

COURSE CODE: PSY 110

COURSE TITLE: QUANTITATIVE TECHNIQUES IN EDUCATION

EXAMINATION DURATION: 3 HOURS

DATE: 08/12/17   TIME: 09.00-12.00 PM

INSTRUCTION TO CANDIDATES

- **The examination has SIX (6) questions**

- **Question ONE (1) is COMPULSORY**

- **Choose any other THREE (3) questions from the remaining FIVE (5) questions**

- **Use sketch diagrams to illustrate your answer whenever necessary**

- **Do not carry mobile phones or any other written materials in examination room**

- **Do not write on this paper**

This paper consists of FIVE (5) printed pages   *please turn over*

QUESTION ONE (COMPULSORY)

(a) State three advantages of standard deviation **[3 marks]**

(b) Differentiate between measurement and evaluation **[3 marks]**

(c) Consider the set T = {453, -453, and 534}. List subsets of T **[3 marks]**

(d) Find the inverse of $\begin{pmatrix} 2 & -1 & 2 \\ 1 & 3 & -2 \\ 4 & -4 & 3 \end{pmatrix}$ **[5 marks]**

(e) Find geometric mean of the following;

125, 106, 113, 5, 120, 103, 321, 98, 111, 78 **[3 marks]**

(f) Solve for x; **[5 marks]**

$(\log_3 x)^2 - \log_9 x^3 - 1 = 0$

(g) Discuss three uses of a test **[3 marks]**

QUESTION TWO

The table below shows IQ scores by students in a University.

Marks	120-129	130-139	140-149	150-159	160-169	170-179	180-189
Students	13	16	111	120	113	15	12

Calculate;

(a) Arithmetic mean **[3 marks]**

(b) Standard deviation **[4 marks]**

(c) Harmonic mean **[3 marks]**

(d) Quartile deviation **[5 marks]**

QUESTION THREE

(a) Sixty form four students in Tahidi high sat for a mathematics examination. Their marks were grouped into seven classes as follows: 30 – 34, 35 – 39, 40 – 44, 45 – 49, 50 – 54, 55 – 59, 60 – 64 and then named as cheetah, lion, zebra, rabbit, giraffe, elephant and buffalo respectively. The form 4 student population was then analyzed in the form of a pie-chart as shown below.
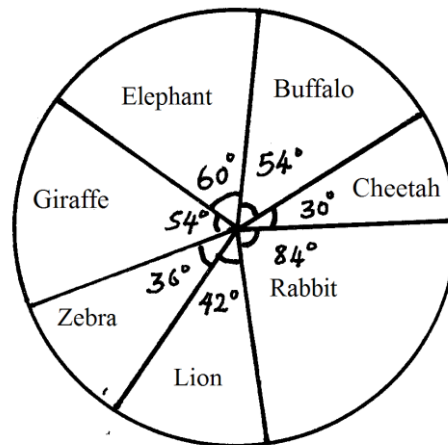
Using the information above

   i.   Complete the table below   **[3 marks]**

Name	Marks	No. of students
Cheetah	30-34	
Lion	35-39	
Zebra	40-44	
Rabbit	45-49	
Giraffe	50-54	
Elephant	55-59	
Buffalo	60-64	

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Use the above table to compute;

   ii.   Quartile deviation **[4 marks]**

   iii.   Harmonic mean **[4 marks]**

   iv.   Geometric mean **[4 marks]**

QUESTION FOUR

(a) Solve the

$4x_1 + x_2 - 5x_3 = 8$

$-2x_1 + 3x_2 + x_3 = 12$

$3x_1 - x_2 + 4x_3 = 5$ **(8 marks)**

(b) In a mock examination, the overall mean score was 100 and the standard deviation 20. Assuming that the scores were normally distributed and the classes which did the mock had 200 pupils altogether:
   i.   How many pupils scored marks between 80 and 120?
   ii.   How many scored between 110 and 120?
   iii. Which score separates the upper 20% of scores from the lower 80 in the mock

       examination **[7 marks]**

QUESTION FIVE

(a) From a sample of 800 consumers, 230 took coffee, 245 took tea and 325 took cocoa, 30 took all the three beverages, 70 took coffee and cocoa, 110 took coffee only, 185 took cocoa only.

 Using a Venn diagram find;

   i.   The number of customers who took tea only **[2 marks]**
   ii.   The number of customers who took coffee and tea only **[2 marks]**
   iii. The number of customers who took tea and cocoa only **[2 marks]**
(b) Set A = { *even numbers between* 113 *and* 125},

  Set B ={ *divible by three btweeen* 113 *and* 125}.

  Find the value of

   i. A union B **[2 marks]**
   ii. A intersection B **[2 marks]**
   iii. A∆B **[3 marks]**
   iv. How many subsets can be obtained from set B **[2 marks]**

QUESTION SIX

(a) The sample mean of a certain test for a group of 36 students is 15 and it is known that the population variance of this test is 16. Construct a 95% confidence interval for the population mean, μ. **[5 marks]**

(b) A company produces jars of English Honey. The weight of the glass jars used is normally distributed with a mean of 122.3 g and a standard deviation of 2.6 g. Calculate the probability that a randomly chosen jar will weigh more than 127. **[5 marks]**

(c) The weight of honey put into each jar by a machine is normally distributed with a standard deviation of 1.6 g. The machine operator can adjust the mean weight of the honey put into each jar without changing the standard deviation. Find, correct to 4 significant figures, the minimum that the mean weight can be set to such that at most 1 in 20 of the jars will contain less than 454 g.

[5 marks]