CHUKA **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF

GEOG 246: QUANTITATIVE METHODS IN GEOGRAPHY

STREAMS: **TIME: 2 HOURS**

DAY/DATE: FRIDAY 17/04/2020 **2.30 P.M. – 4.30 P.M.**

INSTRUCTIONS:
- **Answer question ONE and any other TWO questions.**

1. (a) Write concise notes on the following terms and concepts

      (i) Probability of an event (2 marks)

      (ii) Outlier (2 marks)

      (iii) Standard error (2 marks)

  (b) Differentiate between:

      (i) Type I and Type II error (4 marks)

      (ii) Discrete and continuous random variable (4 marks)

      (iii) Union and intersection of a set (4 marks)

  (c) If the level of significance is 0.05 and the p-value is 0.06, what conclusion can you draw? (2 marks)

  (d) What is the y-intercept of the line of best fit? What does it represent? (2 marks)

  (e) Explain what it means when a correlation has an r^2 of 0.72. (2 marks)

  (f) State the null hypothesis for a one-way ANOVA test of there are four groups. (2 marks)

(g)   The mean pay according to gender for member of a certain company is as in the
        table below:

	N	Mean Pay	S.D
Women	57	$9.68	1.0550
Men	51	$10.32	.9461

What can we conclude about the differences in wages?   (4 marks)

2.   (a)   In the sample given below, there are 300 females and 200 males. Using chi-
               square, go through the steps of hypothesis testing to ascertain if there is a
               significant difference between males and females in their likelihood of being in
               poverty? Test this at the 5% level of significance.   (10 marks)

	Females	Males
In poverty	150	50
Out of poverty	150	150

(b)   A training program was conducted to improve participants' knowledge on Map
        Reading. Data were collected from a selected sample both before and after the Map
        Reading training program. Go through the steps of hypothesis testing to test the
        hypothesis that the training is effective to improve participants knowledge on map
        reading at $\alpha = .05$ (10 marks)

Data set

Pre	12	14	13	11	12	10	15	13	9	14
Post	15	17	13	15	16	14	18	17	8	18

3.   A study was conducted to find out the type of relationship between human geography and
       quantitative methods in geography scores for geography students. The results are displayed
       in the table below

Student	Human geography score	Quantitative method in geography score
1	84	69
2	74	64
3	48	56
4	54	72
5	72	85
6	71	68
7	96	87
8	75	86
9	69	71
10	100	91
11	23	31

12	58	65
13	94	89
14	76	71
15	52	54
16	61	66
17	77	78
18	98	97
19	83	84
20	77	71

(a) Use Pearson's Product Moment Correlation to compute correlation between the two sets scores. (8 marks)

(b) Work out the coefficient of determination and explain its significance. (4 marks)

(c) Calculate the least squares regression line. (8 marks)

4. (a) What are basic assumptions of ANOVA. (5 marks)

(b) Four sports teams of Chuka University took a random sample of players regarding their GPAs for the last year. The results are shown below:

GPAs for Four Sports Teams

Basketball	Football	Hockey	Volleyball
3.6	2.1	4.0	2.0
2.9	2.6	2.0	3.6
2.5	3.9	2.6	3.9
3.3	3.1	3.2	2.7
3.8	3.4	3.2	2.5

Use a significance level of 5% and determine if there is a difference in GPA among the teams (15 marks)

5. (a) Distinguish between independent sample t-test and pained sample t-test (4 marks)

(b) Deep sea divers have maximum dive times that cannot exceed when going to different depths. The data in the table shows different depths with the maximum dive times in minutes

X (depth in feet)	Y(maximum dive time)
50	80
60	55
70	45
80	35
90	25
100	22

(i)   Draw a scatter plot to the distribution.   (4 marks)

(ii)   Calculate the least squares regression line.   (8 marks)

(iii)   Predict maximum dive time for 110 feet.   (3 marks)