CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF ARTS

GEOG 146: INTRODUCTION TO STATISTICAL TECHNIQUES IN GEOGRAPHY

STREAMS: BA **TIME: 2 HOURS**

DAY/DATE: MONDAY 29/03/2021 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions.**
- **Use illustrations where appropriate.**

1. (a) Briefly describe the following concepts:

   (i) Chebyshev's Theorem (2 marks)
   (ii) Standard error of the mean (2 marks)

   (b) Distinguish between:

   (i) Discrete and continuous data (2 marks)

   (ii) Parameter and statistic (2 marks)

   (c) Describe how you will determine the scale of measurement for "*Hardword tree species in Mt. Kenya Forest?"* (4 marks)

   (d) Discuss the role of statistics in geographical analysis. (4 marks)

   (e) Depict a positively skewed distribution graphically and indicate the approximate positions of the mean, the median and the mode on the curve. (2 marks)

   (f) State the characteristics of a normal distribution. (4 marks)

   (g) Define sampling error and explain its causes and effects. (4 marks)

(h) Identify the properties of a poisson experiment. (4 marks)

2. (a) The following table gives the frequency distribution of 325 workers of a factory, according to their average monthly income in a certain year.

Income group (Thousands)	Number of workers
50-100	1
100-150	20
150-200	42
200-250	55
250-300	62
300-350	45
350-400	30
400-450	25
450-500	15
500-550	18
550-600	10
600-650	02
	325

Calculate: (i) Mean income (4 marks)
(ii) Median income (4 marks)
(iii) Mode income (4 marks)

(b) An examination consists of 10 multi-choice questions, in each of which a candidate has to deduce which one of the five suggested answers is correct. A completely unprepared student maybe assumed to guess each answer purely randomly. What is the probability that this student gets 8 or more questions correct?
(4 marks)

(c) A company pays its employees an average wage of $3.25 an hour with a standard deviation of 60cents. If the wages are approximately normally distributed, determine the proportion of workers getting wages between $ 2.75 and $ 3.69an hour.
(4 marks)

3. (a) What are the properties of a binomial experiment. (4 marks)
(b) The daily temperate recorded in a city in Russia in a year is given below. Calculate Standard Deviation. (8 marks)

Temperature C^0	No. of days
-40 to -30	10
-30 to -20	18
-20 to -10	30
-10 to 0	42

0 to 10	65
10 to 20	180
20 to 30	10
	365

(c) The probability that a car travelling along a certain road will have a tyre burst is 0.1. find the probability that among 15 cars.

(i) Exactly one has a tyre burst. (2 marks)

(ii) At most three have burst tyres. (3 marks)

(iii) Two or more have burts tyres. (3 marks)

4. (a) The daily temperature recorded in Nanyuki in a certain year as given below. Calculate Standard Deviation. (10 marks)

Temperature ^0C	No. of days
10 to 12	10
13 to 15	18
16 to 18	30
19 to 21	52
22 to 24	75
25 to 27	160
28 to 30	20
	365

(b) The following data given the average travel time from home to work (in minutes) for 50 towns in Kenya.

22.4	18.2	23.7	19.8	26.7	23.4	22.5	24.3	26.7	24.2
19.7	27.0	21.7	17.6	17.7	22.5	21.2	29.2	26.1	22.7
21.6	21.9	23.2	16	16.1	22.3	28.7	19.9	31.2	22.6
15.4	22.1	19.6	21.4	23.8	21.9	15.6	22.7	23.6	20.8
21.1	25.4	24.9	25.5	20.1	17.1				

(i) Construct a frequency distribution table. (3 marks)

(ii) Calculate the relative frequencies and percentages for all classes (3 marks)

(iii) Construct a histogram and frequency polygon (4 marks)

5. (a) In a moderately asymmetrical distribution, the values of mode and mean are 22.6 and 25.4 respectively. Find the median value (3 marks)

(b) The data below shows the number of motor vehicles passing through toll stations, A and B in one week.

No. of motor vehicles	Toll stations A	Toll stations B
50 – 59	15	43
60 – 69	25	99
70 – 79	40	54
80 – 89	108	40
90 – 99	92	14
100+	20	0

(i) By means of Ogives compare the distributions of motor vehicles as recorded at the two stations. (9 marks)

(ii) From the Ogives determine the frequency distribution below 70 and 90 vehicles for toll stations A and B respectively. (4 marks)

(iii) From the Ogives determine the class limits below 50%. (4 marks)
