CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN HEALTH RECORDS AND INFORMATION MANAGEMENT

HRIM 141: INTRODUCTION TO MEDICAL STATISTICS

STREAMS: BSC HEALTH RECORDS Y1S2 TIME: 2 HOURS

DAY/DATE: WEDNESDAY 12/04/2023 2.30 P.M – 4.30 P.M

INSTRUCTIONS:

- **ANSWER ALL QUESTIONS**

SECTION A: MULTIPLE CHOICE QUESTIONS [ONE MARK EACH] [10 MARKS]

1. Method used to compute average or central value of collected data is considered as?
   A. Measures of positive variation
   B. Measures of central tendency
   C. Measures of negative skewness
   D. Measures of negative variation
2. The shape of the Normal Curve is ___________
   A. Bell-shaped
   B. Flat
   C. Circular
   D. Spiked
3. The number of classes in a frequency distribution is obtained by dividing the range of variable by the:
   A. Total frequency
   B. Class interval
   C. Mid-point
   D. Relative frequency
4. The column headings of a table are known as:
   A. Stubs
   B. Sub-titles
   C. Reference noes
   D. Caption

5. When an investigator uses the data which has already been collected by others, such data is called?
    A. Primary data
    B. Collected data
    C. Processed data
    D. Secondary data
6. The listing of the data in order of numerical magnitude is called
    A. Raw data
    B. Arrayed data
    C. Discrete data
    D. Continuous data
7. A scatterplot shows:
    A. Scores on one variable plotted against scores on a second variable.
    B. The frequency with which values appear in the data.
    C. The average value of groups of data.
    D. The proportion of data falling into different categories.
8. Family members in a family is an example of a:
    A. Continuous variable
    B. Dependent variable
    C. Qualitative variable
    D. Discrete variable
9. Which of the following statements about nominal data is true?
    A. Nominal data have magnitude.
    B. Nominal data are categorical.
    C. Nominal is a synonym for 'continuous'.
    D. All nominal variables are dichotomous.
10. Which of the measures given here are based on every item of the series (uses all observations)?
    A. Range
    B. Standard Deviation
    C. Quartile Deviation
    D. All of them

SECTION B: [40 MARKS]

1. Differentiate between the following terms as used in statistics [6 marks]
    i. Qualitative and quantitative variable
    ii. Continuous and discrete variable
    iii. Sample and population

2. Plot a stem leaf of the following data set; 27, 57, 62, 21, 65, 24, 89, 51, 55, 22, 87, 50, 90, 60, 28, , 49, 33, 71, 29, 44, 88, 37, 84, 75, 72, 80, 81, 42, 52, 83, 70, 66, 79, 58, 35, 30. [4 marks]

3. Explain four (4) characteristics of a good screening test [4 marks]

4. The following data shows the systolic blood pressure of 12 patients who received medical attention in a given hospital. Using the data; 130, 148, 133, 108, 155, 168,128, 118, 165,110, 143, 136.

a) Find the standard deviation of the data. [4 marks]
b) Calculate the coefficient of variation. [3 marks]
c) Find the standard error of the mean. [3 marks]

5. A survey was carried out to assess the weight status of diabetic patients in a given county. The data below shows the weight in Kgs of 8 patients who participated in the survey; 72, 68,64,117,80, 62, 96, 67.
   a) Calculate the geometric mean of the data. [4 marks]
   b) Determine if the largest value is an outlier at 99% confidence level. [4 marks]
   c) Attach a 95% confidence interval to the mean weight of the participants. [4 marks]

6. Outline four (4) characteristics of statistical data [4 marks]

SECTION C: [20 MARKS]

1. The following table shows the circulating albumin in gm (CI) of 40 patients who visited a given hospital.

Circulating albumin in gm (CI)	Frequency (f)
100-109	4
110-119	7
120-129	10
130-139	8
140-149	9
150-159	2
Total	

Find the mean, standard deviation and interquartile range of the patients' circulating albumin [12 marks]

2. A screening test was done in a population of 4000 people with a disease prevalence of 10%. The test result confirmed that 140 people who had the disease were positive as well as 40 persons who did not have the disease.
   i. Summarize this information in a 2 x 2 contingency table. [4 marks]
   ii. Calculate the sensitivity of the screening method. [2 marks]
   iii. Calculate the negative predictive value. [2 marks]

Critical Values of Expanded Dixon Outlier Test (*Q* -Test)

n	CL SL α	70% 30% 0.30	80% 20% 0.20	90% 10% 0.10	**95%** **5%** **0.05**	98% 2% 0.02	**99%** **1%** **0.01**	99.5% 0.5% 0.005
3		0.6836	0.7808	0.8850	0.9411	0.9763	0.9881	0.9940
4		0.4704	0.5603	0.6789	0.7651	0.8457	0.8886	0.9201
5		0.3730	0.4508	0.5578	0.6423	0.7291	0.7819	0.8234
6		0.3173	0.3868	0.4840	0.5624	0.6458	0.6987	0.7437
7		0.2811	0.3444	0.4340	0.5077	0.5864	0.6371	0.6809
8		0.2550	0.3138	0.3979	0.4673	0.5432	0.5914	0.6336
9		0.2361	0.2915	0.3704	0.4363	0.5091	0.5554	0.5952
10		0.2208	0.2735	0.3492	0.4122	0.4813	0.5260	0.5658
11		0.2086	0.2586	0.3312	0.3922	0.4591	0.5028	0.5416
12		0.1983	0.2467	0.3170	0.3755	0.4405	0.4831	0.5208
13		0.1898	0.2366	0.3045	0.3615	0.4250	0.4664	0.5034
14		0.1826	0.2280	0.2938	0.3496	0.4118	0.4517	0.4869
15		0.1764	0.2202	0.2848	0.3389	0.3991	0.4385	0.4739
16		0.1707	0.2137	0.2765	0.3293	0.3883	0.4268	0.4614
17		0.1656	0.2077	0.2691	0.3208	0.3792	0.4166	0.4504
18		0.1613	0.2023	0.2626	0.3135	0.3711	0.4081	0.4423
19		0.1572	0.1973	0.2564	0.3068	0.3630	0.4002	0.4333
20		0.1535	0.1929	0.2511	0.3005	0.3562	0.3922	0.4247
21		0.1504	0.1890	0.2460	0.2947	0.3495	0.3854	0.4173
22		0.1474	0.1854	0.2415	0.2895	0.3439	0.3789	0.4109
23		0.1446	0.1820	0.2377	0.2851	0.3384	0.3740	0.4051
24		0.1420	0.1790	0.2337	0.2804	0.3328	0.3674	0.3986
25		0.1397	0.1761	0.2303	0.2763	0.3287	0.3625	0.3935
26		0.1376	0.1735	0.2269	0.2725	0.3242	0.3583	0.3889
27		0.1355	0.1710	0.2237	0.2686	0.3202	0.3543	0.3843
28		0.1335	0.1687	0.2208	0.2655	0.3163	0.3499	0.3801
29		0.1318	0.1664	0.2182	0.2622	0.3127	0.3460	0.3762
30		0.1300	0.1645	0.2155	0.2594	0.3093	0.3425	0.3718
31		0.1283	0.1624	0.2132	0.2567	0.3060	0.3390	0.3685
32		0.1268	0.1604	0.2110	0.2541	0.3036	0.3357	0.3646
33		0.1255	0.1590	0.2088	0.2513	0.2999	0.3323	0.3610
34		0.1240	0.1571	0.2066	0.2488	0.2973	0.3294	0.3583
35		0.1227	0.1555	0.2045	0.2467	0.2948	0.3266	0.3548
36		0.1215	0.1540	0.2026	0.2445	0.2921	0.3238	0.3522
37		0.1202	0.1525	0.2008	0.2423	0.2898	0.3213	0.3498
38		0.1192	0.1512	0.1993	0.2408	0.2879	0.3187	0.3465
39		0.1181	0.1499	0.1974	0.2383	0.2853	0.3163	0.3443
40		0.1169	0.1484	0.1958	0.2366	0.2836	0.3141	0.3415
41		0.1160	0.1472	0.1944	0.2350	0.2815	0.3124	0.3400
42		0.1153	0.1462	0.1930	0.2334	0.2794	0.3102	0.3377
43		0.1141	0.1449	0.1915	0.2319	0.2778	0.3081	0.3353
44		0.1134	0.1441	0.1902	0.2302	0.2758	0.3061	0.3332
45		0.1124	0.1430	0.1890	0.2288	0.2744	0.3050	0.3325
46		0.1116	0.1418	0.1875	0.2273	0.2726	0.3028	0.3298
47		0.1108	0.1408	0.1865	0.2257	0.2711	0.3009	0.3279
48		0.1102	0.1400	0.1850	0.2241	0.2690	0.2991	0.3256
49		0.1093	0.1390	0.1839	0.2228	0.2676	0.2972	0.3235
50		0.1087	0.1381	0.1829	0.2216	0.2662	0.2960	0.3225