

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATION
RESIT/SUPPLEMENTARY / SPECIAL EXAMINATIONS
EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE,
BACHELOR OF EDUCATION AND BACHELOR OF ARTS**

MATH 454/451: NON-PARAMETRIC METHODS**STREAMS: BSC, BED, BA****TIME: 2 HOURS****DAY/DATE: MONDAY 01/11/2021****2.30 P.M - 4.30 P.M.****INSTRUCTIONS:**

- Answer all the questions

QUESTION ONE

- a. The following is an arrangement of men (M) and women (U) lined up to pay graduation fee in Chuka University Finance Office 2018.

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Test for randomness at $\alpha=5\%$

[10 marks]

- b. In an evaluation of various methods of teaching, the following marks were awarded to seven groups of students taught by different methods.

Group A	65	78	37	97	80	77
Group B	65	87	73	79	85	75
Group C	75	69	83	81	83	62
Group D	59	78	67	62	59	80
Group E	94	89	80	88	87	69
Group F	85	75	62	78	73	94
Group G	56	88	73	77	58	57

Use Kruskal-Wallis test at $\alpha=5\%$ to test whether the methods are equally effective

[10 marks]

- c. The following data represent the breaking strength of a certain kind of elastic material in pounds

190	165	160	189	161	171	158
151	169	163	139	162	172	165
148	166	172	163	187	173	163

Use the sign-test to test whether the average breaking strength is greater than 160.

Use $\alpha=5\%$

[10 marks]

QUESTION TWO

The weights of eighty cartons of cooking fat are given below.

19	50	57	25	61	42	26	33	46	45
63	31	80	36	29	56	38	69	83	40
52	17	35	65	28	63	72	29	56	57
22	45	53	44	78	47	86	55	66	48
41	64	38	43	13	58	55	32	52	46

Test the null hypothesis that the sample is random at 5% significance level. [20 Marks]

QUESTION THREE

- a. Using the Kolmogorov-Smirnov methods, test the hypothesis that the following values form a random sample from a uniform distribution. Use $\alpha=5\%$

-0.81	0.41	0.36	0.92	-0.56	1.86	1.74	0.56	0.95	0.24	1.74
-0.15	-0.74	0.94	-0.64	0.32	0.82	0.70	0.10	-1.26	-1.06	0.15
	0.55	-0.48	-0.49	0.16						

[15 marks]

- b. Let $Y_1 < Y_2 < \dots < Y_{30}$ denote the order statistics of a random sample of size 30 from a distribution of a continuous type.

Compute $P(Y_{20} < \pi_{0.75} < Y_{30})$

[5 marks]