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OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2020 /2021 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE (APPLIED STATISTICS WITH COMPUTING)

COURSE CODE: STA 215

COURSE TITLE: INTRODUCTION TO APPLIED STATISTICS

DATE: 16/03/2021 TIME: 1400 – 1700 HRS

INSTRUCTION TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF 3 PRINTED PAGES PLEASE TURN OVER

REGULAR – MAIN EXAM

STA 215: INTRODUCTION TO APPLIED STATISTICS

STREAM: ASC/MIC DURATION: 3 hours

INSTRUCTION TO CANDIDATES

Answer **ALL** questions from section A and any **THREE** from section B.

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SECTION A [31 Marks] Answer All questions]

QUESTION ONE (16Marks)

a) What is statistical hypothesis? Give an example. [2 Marks]

b) Distinguish between dependent and independent samples. [2 Marks]

c) Given that a random sample of 196 patients has a mean of survival times of 63.9 years and standard deviation is 42.7 years. Calculate the 95% C.I for the population mean. [4 Marks]

d) A sample of students has a mean age of 35 years with a standard deviation of 5 years. A student was randomly picked from a group of 200 students. Find the probability that the age of the student is between 35 and 40 years. [4 Marks]

e) Suppose the number of goals scored in five hockey matches is shown in the table below: 10, 13, 17, 14 and 12 compute the standard deviation. [4 Marks]

QUESTION TWO [15 Marks]

a) Distinguish between type I and type II error. [2 Marks]

b) What three properties that binomial events must fulfil? [3 Marks]

c) Distinguish between the null and alternative hypotheses [2 Marks]

d) Suppose scores made by students in a Statistics class in the mid-term and final examination are given as follows. (98, 90), (66, 74), (100,98), (96,88), (88,80), (45,62), (76,78), (60,74), (74,86) and (82,80)

i) Plot a scatter diagram and comment on the relationship [3 Marks]

ii) Develop a regression equation used to predict the final score levels using mid-term score. [5 Marks]

SECTION B [39 Marks] Answer any THREE questions]

QUESTION THREE [13 Marks]

Let variable X be the number of hamburgers consumed at a cook-out, and variable Y is the number of beers consumed

X	19	25	19	29	28	12	32	16	23	11
Y	22	32	43	21	39	13	47	16	13	13

Calculate;

a) Karl Pearson coefficient of correlation. [7 Marks]
b) Spearman's rank correlation coefficient. [6 Marks]

QUESTION FOUR [13 Marks]

A medical survey was conducted in order to establish the proportion of the population which was infected with cancer. The results indicated that 40% of the population were suffering from the disease. A sample of 6 people was later taken and examined for the disease. Find the probability that the following outcomes were observed

a) Only one person had the disease [2 Marks]
b) Exactly two people had the disease [2 Marks]
c) At most two people had the disease [3 Marks]
d) At least two people had the disease [3 Marks]
e) Three or four people had the disease [3 Marks]

QUESTION FIVE [13 Marks]

a) Name any three scales of measurement. [3 Marks]
b) What do you understand by term power of a test? [2 Marks]
c) A reading center claims that students will perform better on a standardized reading test after going through the reading course offered by their center. The table shows the reading scores of 6 students before and after the course. At $\alpha = 0.05$, is there enough evidence to conclude that the students' scores after the course are better than the scores before the course? [8 Marks]

Student	1	2	3	4	5	6
Score before	85	96	70	76	81	78
Score after	88	85	89	86	92	89

QUESTION SIX [13 Marks]

a) A manufacturer assures his customers that the probability of having defective item is 0.005. A sample of 1000 items was inspected. Find the probability that only one is defective. [3 Marks]

b) The following data are taken from a study that compares adolescents who have bulimia to healthy adolescents with similar body compositions and levels of physical activity. The data consist of measures of daily caloric intake in kcal/kg for random samples of six bulimic adolescents and seven healthy ones

Bulimic	15.9	16.5	16.1	17.2	17.8	17.4	
Healthy	20.7	23.1	22.6	23.8	22.5	23.9	22.3

Use Mann-Whitney test to ascertain if there any significant difference daily caloric intake for the bulimic and healthy individuals at 5% level. [10 Marks]

QUESTION SEVEN [13 Marks]

An experiment was conducted using five brands of fertilizers A, B, C, D and E applied to each of the four plots in a completely randomized design (CRD) and yield of wheat in kilograms per plot were as shown in the table below ($\alpha = 0.05$).

C 18	A 8	A 8	B 13	E 9
C 17	B 10	A 6	D 10	D 15
C 13	A 10	E 8	B 9	D 11
B 12	C 16	D 12	E 11	E 8

Construct an ANOVA table. Is there any difference in yield when the five brands of fertilizer were used? [13 Marks]