ALUPE UNIVERSITY COLLEGE

...Bastion of Knowledge....

P. O.Box 845-50400 Busia(K)
principal@auc.ac.ke
Tel: +254 741 217 185
+254 736 044 469
off Busia-Malaba road

OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, RESEARCH AND STUDENT AFFAIRS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

1st YEAR 1st SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN APPLIED STATISTICS WITH COMPUTING

COURSE CODE: STA 111

COURSE TITLE: INTRODUCTION TO PROBABILITY AND STATISTICS I

DATE: 19/1/2022   **TIME: 2.00-5.00PM**

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF 5 PRINTED PAGES   **PLEASE TURN OVER**

REGULAR – MAIN EXAM

STA 111: INTRODUCTION TO PROBABILITY AND STATISTICS I

STREAM: ASC   **DURATION: 3 Hours**

INSTRUCTION TO CANDIDATES
Answer **ALL** questions from section A and **ANY THREE** Questions in section B.
All questions in section B carry Equal Marks

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SECTION A (31Marks): Answer ALL questions

QUESTION ONE (16Marks)

a) Define the following terms as used in statistics
    i)   Statistics   (1Mark)
    ii)   Probability   (1Mark)

b) Distinguish between
    i)   Discrete and continuous variables   (2Marks)
    ii)   Descriptive and inferential statistics   (2Marks)

c) A fair die, with faces numbered 1 to 6, is rolled once. Find the probability that the score showing up is;
    i)   A multiple of 3   (2Marks)
    ii)   A prime number   (2Marks)

d) A sample of 250 students were asked to indicate their favorite TV channels and their responses were as follows   (2Marks)

TV station	KBC	NTV	CITIZEN	KTN	FAMILY
No. of viewers	26	54	894	62	18

Draw a bar chart to represent this information.

e) Give two merits and demerits of the arithmetic mean   (4Marks)

QUESTION TWO (15Marks)

a) Find the harmonic and geometric mean of the frequency table below   (4Marks)

Class	0-29	30-49	50-79	80-99
Frequency	10	30	50	20

b) Represent by set notation and exhibit on a Venn diagram the following events.
    i)   Both A and B occur   (1Mark)
    ii)   Exactly one of A, B occurs   (2Mark)
    iii)   A and B but not C occurs   (1Mark)
    iv)   At least one of A,B,C occurs   (2Mark)
    v)   At most money of A,B,C occurs   (2Mark)

c) The grades of a student on six examinations were 84, 91, 72, 68, 92, 85 and 72. Find the;
    i.   Arithmetic mean   (1Mark)
    ii.   Median   (1Mark)
    iii.   Mode.   (1Mark)

SECTION B (ANSWER ANY THREE QUESTIONS)

QUESTION THREE (13 Marks):

a) The managers of an import agency are investigating the length of time that customers take to pay their invoices, the normal terms for which are 30 days net, they have checked the payment record of 100 customers chosen at random and have compiled the following table:

Payment in;	Number of customers
5 to 9 days	4
10 to 14 days	10
15 to 19 days	17
20 to 24 days	20
25 to 29 days	22
30 to 34 days	16
35 to 39 days	8
40 to 44 days	3

Required:

i)	Calculate the arithmetic mean	(3Marks)
ii)	Calculate the standard deviation.	(3Marks)
iii)	Construct a histogram and insert the modal value	(4Marks)
iv)	Determine the minimum value for the top ten percent (10%)	(3Marks)

QUESTION FOUR

a) Define the following terms
i)	Experiment	(1Mark)
ii)	Sample space	(1Mark)
iii)	Event	(1Mark)
iv)	Outcome	(1Mark)

b) At a certain assembly plant, three machines make 30%, 45%, and 25%, respectively, of the products. It is known from the past experience that 2%, 3%, and 2% of the products made by each machine, respectively, are defective. Now suppose that a finished product is randomly selected.
i)	What is the probability that it is defective	(2Marks)
ii)	If a product were chosen randomly and found to be defective, what is the probability that it was made by machine?	(3Marks)

c) Given two events A and B in the same sample space such that P(A)=0.59, P(B)=0.3 and P(AB)=0.21. Find;
i)	P(A∪B)	(1Mark)
ii)	P(A′B)	(1Mark)
iii)	P(AB′)	(1Mark)
iv)	P(A∪B′)	(1Mark)

QUESTION FIVE

d) Define the following terms
   i)   Skewness   (1Mark)
   ii)   Kurtosis   (1Mark)
e) Find the moment of coefficient of skewness and kurtosis for the data given on marks given by the table below   (7Marks)

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	14	28	25	18	14	8

f) Using the following data; 3, 6, 9, 10, 7, 12, 13, 15, 6, 5, 13
   Find;
   i)   the lower and upper quartiles   (2Marks)
   ii)   the 7th decile and the 85th percentile of the following data.   (2Marks)

QUESTION SIX

The price of ordinary 25 shares of Safaricom quoted on the securities exchange, at the close of the business on successive Fridays is tabulated below

126	120	122	105	129	119	131	138
125	127	113	112	130	122	134	136
128	126	117	114	120	123	127	140
124	127	114	111	116	131	128	137
127	122	106	121	116	135	142	130

Required

   i)   Group the above data into eight classes   (2Marks)
   ii)   Calculate the cumulative frequency, the median value, quartile values and the semi-quartile range   (3Marks)
   iii) Calculate the mean and standard deviation of your frequency distribution.   (4Marks)
   iv)   Compare and contrast the values that you have obtained for;
         a.   The median and mean   (2Marks)
         b.   The semi-inter-quartile range and the standard deviation   (2Marks)

QUESTION SEVEN

a) Discuss any four data collection methods clearly stating their merits and demerit.
                                                                      (13Marks)

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