

STA 205



OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2018 /2019 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER REGULAR EXAMINATION

**FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)**

COURSE CODE: STA 205

COURSE TITLE: PROBABILITY AND STATISTICS

DATE: 26/4/2019

TIME: 9.00 AM - 12.00 PM

INSTRUCTION TO CANDIDATES

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STA 205

REGULAR – MAIN EXAM

STA 205: PROBABILITY AND STATISTICS

STREAM: BSC COMPUTER SCIENCE

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 (31 marks): Answer ALL questions.

QUESTION ONE (16 Marks)

- a) List and explain five stages in statistical investigation. [5Marks]
- b) Distinguish between the following terms;
- i) Nominal data and ordinal data [2Marks]
 - ii) Discrete data and continuous data [2Marks]
- c) A boy throws a fair coin and a die. Find the probability that he will get 3 on the die and a head on the coin? [3Marks]
- d) Define the following terms
- i) Test statistics [1Mark]
 - ii) Rejection region [1Mark]
 - iii) Null hypothesis [1Mark]
 - iv) Sample space [1Mark]

QUESTION TWO (15 Marks)

- a. i) Define correlation analysis [2Marks]
- ii) Find the Pearson correlation coefficient between sales (in thousands unit) and expenses (in thousands shillings) of the following 10 firms. [5Marks]

Firm	1	2	3	4	5	6	7	8	9	10
Sales	50	50	55	60	65	65	65	60	60	50
Expenses	11	13	14	16	16	15	15	14	13	13

- b) The weight of 5 girls were recorded as 25.8, 36.6, 26.3, 21.8 and 27.2. Test the hypothesis that their mean weight exceeds 25kg. [4Marks]

- c) List four conditions that satisfy binomial distribution. [4Marks]

SECTION B (39 MARKS, CHOOSE ANY THREE QUESTIONS)

QUESTION THREE (13 marks)

- a) A consulting firm is bidding for two jobs, one with each of two large multinationals. The company executives estimate that the probability of obtaining the consulting job with firm A, event A is 0.45. The executive also feel that if the company should get the job with firm A, then there is a 0.90 probability that firm B will also give the company the consulting job. What are the company's chances of getting both jobs? [5Marks]
- b) The weekly wages of 2000 workmen is normally distributed with mean wage of 70 and standard deviation of sh 5. Estimate the number of workers whose weekly wages are;
- i) Between sh 70 and sh 71 [2Marks]
 - ii) Between sh 69 and sh 73 [2Marks]
 - iii) More than 72 [2Marks]
 - iv) Less than sh 65 [2Marks]

QUESTION FOUR (13 marks)

- a) The data below shows the degree of soiling for fabric with three different mixtures. Test the hypothesis that the mean degree for soiling is the same for the 5 mixtures. [5Marks]

Mixtures	Degree of soiling				
1	0.56	1.12	0.90	1.07	0.94
2	0.72	0.62	0.87	0.78	0.91
3	0.62	1.08	1.07	0.99	0.93

- b) Distinguish between the following;
- i) Type one error and type two error [4Marks]
 - ii) Equally likely events and mutually exclusive events [4Marks]

QUESTION FIVE (13 Marks)

- a) List four properties of probability [4Marks]
- b) List and explain any three types of probability sampling techniques. [6Marks]



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- c) Explain the term regression analysis. [3Marks]

QUESTION SIX (13 Marks)

- a) The table below shows the distribution of monthly wages (in \$) of 100 employees of a certain firm.

Wages (in \$)	Frequency (f)
40-49	4
50-59	8
60-69	21
70-79	35
80-89	22
90-99	6
100-109	4

- a) Find the:
- i) The lower and upper quartiles [4Marks]
 - ii) Quartile deviation [1Mark]
 - iii) Median [2Marks]
- b) Using the data in part (a), sketch;
- i) Cumulative frequency curve [2Marks]
 - ii) A histogram [2Marks]
 - iii) A frequency polygon [2Marks]

QUESTION SEVEN (13 Marks)

- a) Tuscany claims that 70% of local pet owners own a dog, and 30% own a cat. Sayber decides to test her claim and learns that 23 of the 40 people he asks own dogs, and 17 own cats.
- i) What kind of test could you use to see if Sayber's data supports Tuscany's claim? [2Marks]
 - ii) What would be the null and alternative hypotheses? [2Marks]
 - iii) What would be the expected values of dog and cat owners? [2Marks]
 - iv) What is the chi-square statistic of the observed data? [4Marks]
 - v) Assuming a 0.1 significance level, does Sayber's data support Tuscany's claim? [3Marks]
