



UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

Business and Humanities Certificate Examinations

NOV-DEC SERIES

PROGRAMME

CERTIFICATE IN INFORMATION AND COMMUNICATION TECHNOLOGY

PAPER NAME

INTRODUCTION TO PROBABILITY AND STATISTICS I

PAPER CODE

CPS111

YEAR I SEMESTER I

2½ HOURS

WEDNESDAY, 11TH DECEMBER, 2019

INSTRUCTIONS TO CANDIDATES

1. This paper consists of **two** sections **A** and **B**.
2. Section **A** is compulsory and carries **20** marks.
3. Section **B** consists of **six** questions. Answer only **four** questions from this section.
4. All questions carry equal marks.
5. Answers to all each question should begin on a fresh page.
6. **Do not** write on this question paper.
7. All answers and rough work should be done in the official answer booklet provided.
8. Non-programmable electronic calculators, mathematical tables, and graph papers may be used for this examination.
9. Read other instructions on the answer booklet.

SECTION A - (20 MARKS)

Answer all questions in this section

Question One

- (a) Outline **two** characteristics of a good statistical unit. (02 marks)
- (b) Andale's salary in Uganda shillings was fluctuating as follows; 115,000, 216,000, 260,000, 200,000, 760,000. Calculate the mean absolute deviation of the salary earned by Andale. (04 marks)
- (c) Explain what is meant by the term confidence limits as used in statistics. (02 marks)
- (d) State **two** merits of range as a measure of dispersion. (02 marks)
- (e) If the probability that a student will pass an examination is 0.6. What is the probability that the student will fail the examination? (02 marks)
- (f) Outline **two** methods of collecting data. (02 marks)
- (g) Differentiate between convenience sampling and judgment sampling. (02 marks)
- (h) Given that the points passing through a regression line are (2, 6) and (4, 12), find the slope of the line. (02 marks)
- (i) State the central limit theorem as used in sampling distribution. (02 marks)

SECTION B - (80 MARKS)

Answer only four questions from this section.

Question Two

- (a) A company is independently producing two drinks; Akandi (A) and banana wine (B). The chance that the company will produce A on time is 80% while the chance that B will be produced on time is 60%. Find the probability that;
- (i) Both drinks will be produced on time. (03 marks)
- (ii) None of the drinks will be produced on time. (03 marks)
- (iii) Exactly one drink will be produced on time. (03 marks)
- (iv) At most one drink will be produced on time. (03 marks)
- (b) A survey of 200 persons revealed that 100 persons read Bukedde (B), 60 persons read the Sun (S) and 20 persons read both B and S. Find the probability that the next person chosen at random;
- (i) Reads either the sun or Bukedde. (06 marks)
- (ii) Neither reads B nor S. (02 marks)

Question Three

- (a) (i) Explain why if a sample from a population is to give reliable information about the population, it must be chosen at random. (04 marks)
- (ii) Explain **three** properties of the sampling distribution of the mean. (06 marks)
- (b) The average number of customers entering Kenjoy supermarket in Kampala in a week is 165 with a variance of 729. A random sample of 36 customers is taken. Determine the probability that the sample mean will be;
- (i) Greater than 170. (05 marks)
- (ii) Between 155 and 160 (05 marks)

Question Four

A random sample of 64 sales invoice has been classified by the sales value into the table 1.

Table 1

Value (UGX)	Number of invoices
0 – 100	20
100 – 200	18
200 – 300	22
300 – 400	15
400 – 500	09
500 – 600	08
600 – 700	04
700 – 800	02

- (a) Compute the;
- (i) Mean of the sample. (04 marks)
- (ii) Standard deviation of the sample. (06 marks)
- (b) Place confidence limits of the mean value of all sales invoices at;
- (i) 95% confidence level (05 marks)
- (ii) 99% confidence level (05 marks)

Question Five

- (a) Explain the differences between type I error and type II errors as used in hypothesis testing. (04 marks)
- (b) Explain the **five** steps that the investigator should follow when carrying out hypothesis testing. (10 marks)
- (c) Given that the annual income for government employees in a local government is UGX. 18,750. There was some doubt whether the average annual income for government employees in certain county was representative of the local government average. A

random sample of 100 employees in the country was taken salary was UGX. 19,240 with a variance of UGX 6,812,100. Determine whether the average salary of government employees in the country is representative of the district average. (Assume a level of significance of 0.05) (06 marks)

Question Six

- (a) (i) Explain the meaning of the term coefficient of correlation. (02 marks)
(ii) Outline **two** main characteristics of coefficient of correlation. (02 marks)
- (b) Ice cream plant manager recorded the following sales in UGX (000) and mean monthly temperature in degrees centigrade for the most recent eight months season.

Month	Jan	Feb	Mar	April	May	June	July	Average
Temperature	20	32	41	45	38	20	26	14
Sales ('000)	90	120	150	145	150	110	95	80

- (i) Compute the rank correlation coefficient between temperature and sales. (10 marks)
(ii) Interpret your answer in 6(b)(i). (02 marks)
- (c) Represent the data above in a scatter diagram. (04 marks)

Question Seven

The speeds of cars (in km/hr.) were measured by traffic officers and recorded in table 2;

59	47	67	70	35
18	18	20	63	26
49	25	23	16	29
61	68	75	22	37
38	32	37	63	49
20	72	42	55	42
35	65	69	48	58
53	59	67	39	67

- (a) Construct a frequency distribution table showing with a class of 10-19 using inclusive form of grouping. (08 marks)
- (b) Use the table in 7(a) above to compute;
(i) Harmonic average speed. (03 marks)
(ii) Range (03 marks)
(iii) Probability that the car picked at random was moving at speed above average (03 marks)
- (c) Identify **three** properties of a good measure of central tendency. (03 marks)