



SIR ARTHUR LEWIS COMMUNITY COLLEGE
ACADEMIC YEAR (2024/2025) – SEMESTER ONE
END OF SEMESTER EXAMINATION

COURSE CODE : MAT130/MAT131

COURSE TITLE : Introduction to Statistics/Introduction to Probability

LECTURER(S) : Hannah Scott

DATE : 12th December 2024

TIME : 1 p.m. – 3 p.m.

DURATION : 2 Hours

STUDENT ID # : _____

GENERAL INFORMATION AND INSTRUCTIONS

- Students must sign **IN** and **OUT** on the examination class list.
- Write your ID number on the question paper.
- This paper consist of FOUR questions. Answer ALL questions.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

Question 1

a) A popular fast food chain wants to open an outlet in a particular district. The research department collected some data from the district. Among the variables collected were

- A* the number of persons who buy gasoline during a particular period of the day from the gasoline station in the district

- B* the number of business places in the district

- C* the types of businesses in the district

- D* the area of land used for each house in the neighborhood

- E* the days of late closing of the businesses

- F* the number of students from the two schools in the area who wait for the bus near the proposed site of the outlet.

From the data obtained, state the letter (*A, B, C, D, E* or *F*) of

- (i) TWO variables which are qualitative [2]

- (ii) TWO variables which are quantitative [2]

- (iii) ONE discrete variable [1]

- (iv) ONE continuous variable. [1]

b) Indicate whether EACH of the following examples refers to a population or a sample:

- (i) A group of 50 persons selected to test a new milk drink [1]

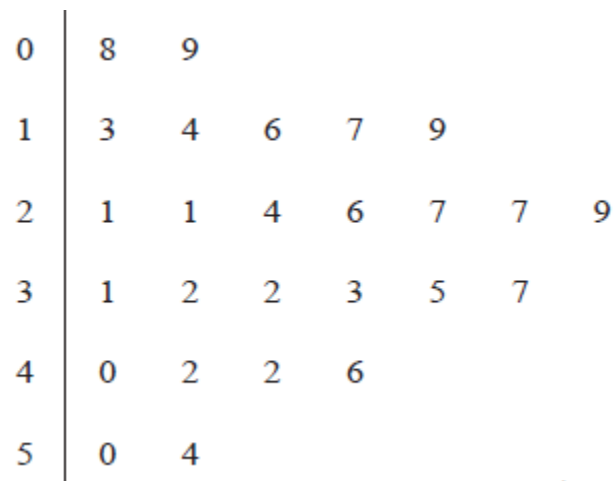
- (ii) The total number of cars sold by a car dealership in the last year [1]

c) State the sampling method used in each of the following: [4]

- (i) A student council surveys 100 students by taking random samples of 43 freshmen, 22 sophomores, 15 juniors, and 20 seniors.
- (ii) A hospital wants to survey religious participants in their city about what they seek from a hospital chaplain, so they randomly select 17 religious meetings in the city and survey every participant in those meetings.
- (iii) A manager associated each employee's name with a number on one ball in a container, then drew balls without looking to select a sample of 25 employees.
- (iv) A researcher polls people as they walk by on the street.

Question 2

- a) The following stem and leaf diagram shows the number of minutes that patients waited at a Medical Centre for treatment.



Key: 3|2 means 32 minutes

- (i) What is an advantage of using a stem and left diagram to represent information? [1]
- (ii) How many patients were in the sample? [1]
- (iii) Determine the range of the time that patients waited for treatment. [3]
- (iv) Determine the median. [2]

- b) The following frequency distribution gives the ages of 200 persons living in a district.

Age, x in years	0 – 20	20 – 40	40 – 50	50 – 70	70 – 80	80 – 90
Number of persons	40	30	40	50	25	15

For the persons living in the district, determine an estimate of

- (i) the mean age [3]
- (ii) the median age [4]
- (iii) the mode age [3]
- (iv) Using 1cm to 10 units on the x -axis and 2cm to 1 unit on the y -axis, use the graph sheet provided, draw a histogram to illustrate the data in the table above. [4]

Question 3

a) You are provided with the following partially completed contingency table for the production levels from three assembly plants of a manufacturing firm:

	Plant A	Plant B	Plant C	Total
Good	350	280	170	800
Defective	200	120	380	700
Total	550	400	550	1500

- (i)

Find the probability that an item chosen at random

a) was a defective item from plant A

[2]

b) was good or from plant A

[3]

c) was from plant C, given that it was defective

[3]
- (ii)

Are the events “Good” and “Plant C” independent?

[3]

b) Assuming that the probability of Carlton playing in a football game is 0.06, the probability of him playing in a cricket game is 0.05, and the probability that if he has already played in a football game, he will also play in the cricket game is 0.15, what is the probability that:

- (i)

Carlton will play in both games

[2]
- (ii)

Carlton will play either in the football game or the cricket game, but not both

[2]
- (iii)

Carlton will not play in any of the games

[2]

Question 4

- a) A small bakery found that it receives orders for as many as 9 special cakes or as few as 4 special cakes for any day. The estimated probability of the number of orders for special cakes for any day is given in the following table, where X is the number of orders received in a day.

x	4	5	6	7	8	9
$P(X = x)$	0.05	0.15	0.35	0.25	0.12	0.08

Calculate the mean number of orders for special cakes [2]

- b) The probability that a manager of a toy store pays for advertising for his store is 0.65. If he pays for advertising, the probability that he will make a profit is 0.77 and if he does not pay for advertising, the probability that he will make a profit is 0.13.
- (i) Draw a fully labeled tree diagram to illustrate the information above [3]
- (ii) What is the probability that he does not pay for advertising but makes a profit?[2]
- (iii) Given that he makes a profit, what is the probability that he does not pay for advertising? [5]

- c) A local jam production company is confident that 60% of the population will like its new grapefruit jelly.
- (i) If 200 persons taste the new grapefruit jelly, determine the number of persons who are expected to like it. [2]
- (ii) From a random sample of 10 persons who tasted the new grapefruit jelly, calculate the probability that less than two will like it. [4]

END OF EXAMINATION