SIR ARTHUR LEWIS COMMUNITY COLLEGE

ACADEMIC YEAR (2024/2025) – SEMESTER TWO

END OF SEMESTER EXAMINATION

ALTERNATE

COURSE CODE	:	**MAT247**
COURSE TITLE	:	**Statistical Applications**
LECTURER(S)	:	**Hannah Scott**
DATE	:	
TIME	:	
DURATION	:	**2 Hours**
STUDENT ID #	:	_____

GENERAL INFORMATION AND INSTRUCTIONS

- Students must sign **IN** and **OUT** on the examination class list.
- Write ID numbers only on the answer booklet.
- **ANSWER ALL QUESTIONS**
- *Formulae sheet and tables are provided.*
- *No programmable calculators are permitted*

Instructions: Answer all questions

Question One

a) i) Distinguish between *primary* and *secondary data*. [2]
ii) List two advantages of using secondary data [2]

b) Explain whether each of the following constitutes a *population* or a *sample* [4]
i. Pounds of fish caught by all fishermen in a bay
ii. Credit card debt of 100 families selected from a city
iii. Amount spent on prescription drugs by 200 senior citizens in a large city
iv. Ages of all family members

c) Indicate which of the following variables are *quantitative* and which are *qualitative*. Classify quantitative variables as *discrete* or *continuous*. [5]
i. Number of typographical errors in a newspaper
ii. Monthly TV cable bill
iii. Spring break locations

Question Two

The time taken to complete an entrance exam to a college is recorded below.

time	Frequency
20-22	5
23-25	6
26-28	12
29-31	5
32-34	7

Using the table above to calculate
a) the sample mean of the dataset. [3]
b) the sample variance of the dataset. [3]

Question Three

a) The probability distribution for the random variable X is shown below

x	0	1	2	3	4
$P(X = x)$	0.1	0.3	a	0.2	0.1

i. Find the value of a [2]
ii. Calculate the mean, E(X) [2]
iii. Calculate the variance, VAR(X) [3]

Question Four

The time that a customer takes to complete a transaction in the business line at the bank follows a normal distribution with a mean of 5.4 minutes and a standard deviation of 1.7 minutes. What is the probability that a customer selected at random will spend more than 8 minutes to complete a transaction? [4]

Question Five

A production line is designed to fill bottles with oil. The amount of oil placed in a bottle is normally distributed and the mean is set to 100 ml. The amount of oil in 8 randomly selected bottles is recorded, and the following statistics are obtained

$$\bar{x} = 92.875 \qquad s = 8.3055$$

a) Construct a 99% confidence interval for , the mean amount of oil placed in a bottle. [4]

b) Jonathan believes that the mean amount of oil placed in a bottle is less than 100 ml. Stating your hypothesis clearly, test at the 5% significance level, whether Jonathan's belief is supported. [6]

END OF EXAMINATION