THE FEDERAL POLYTECHNIC, OFFA

SCHOOL OF APPLIED SCIENCES AND TECHNOLOGY

ARTIFICIAL INTELLIGENCE TECHNOLOGY (AIT) DEPARTMENT

FIRST SEMESTER EXAMINATION, 2023/2024 SESSION

CODE: AIT 312 **TITLE:** PYTHON PROGRAMMING LANGUAGE **UNIT:** 4 units

DEPT.: ARTIFICIAL INTELLIGENCE TECH. **LEVEL:** HND I CS **DURATION:** 2½ HRS

Instruction: ***Answer any FIVE (5) Questions in total.***

Given a dataset called "sales_data.csv" whose first few observations are shown in the table below, assuming the dataset is stored in the same folder as your current Python file. Use the dataset to answer **question (3)**.

	Category	Product	Qty	Sales	Profit
1	Electronics	Samsung 32 inches TV	23	1800000	670000
2	Men Wears	Adidas Round Neck	12	240000	60000
3	Electronics	LG Home Theathre	2	420000	50500
..	…	…	…	…	…

1. a.) Explain any four features of Python programming language **(6 mks)**

b.) Describe with appropriate examples any three (3) buit-in methods of each of the following Python data structures:

i. **String** manipulation ii. **Set** manipulation **(6 mks)**

2. a.) Write short notes, with appropriate examples, on the following Python Data Structures

i. List ii. Tuple iii. Set iv. Dictionary **(6 mks)**

b.) Given the instruction below which assign a list of scores into variable *"scores"*:

scores = [30, 65, 21, 12, 54, 89, 32, 20, 87, 35, 20, 21, 66, 95, 23]

i. Write a Python program using "for" loop that prints only the scores that are odd numbers in the list.

ii. Write a Python statement/instruction to get the last three scores from the list and store it in a variable called *"last_three_scores"*.

(6 mks)

3. Using the dataset "sales_data.csv" shown earlier and "pandas" library, write the Python instruction(s) to perform the following in the same python file:

i. Load the dataset into variable "sales_df" using pandas.

ii. Show the first five and last five rows of the dataset.

iii. Print the statistical summary of the dataset (mean, min, max, etc).

iv. Replace any missing values in "Sales" column with the mean value of all "Sales".

v. Display the sum of all "Qty" sold for all products.

vi. Extract only the *"Sales"* and *"Profit"* columns.

(12 mks)

4. a.) Briefly describe the following Python libraries are used for in AI Projects:
i. Numpy ii. Pandas iii. Matplotlib iv. Sci-kit learn **(6 mks)**
b.) Describe the use of any four (4) Python ***List methods*** with appropriate examples. **(6 mks)**

5. a.) In the context of AI, write short notes on:
i. Data Preprocessing ii. Data Visualization **(6 mrks)**
b.) Write a Python program to calculate the total cost of the items added to the shopping cart below following product, given that the ***total_cost*** is calculated as **quantity x price**.

```
cart = [
    {"product": "Prada Shoe", "price": 45000, "qty": 10},
    {"product": "Gucci Bag", "price": 15000, "qty": 6},
    {"product": "Nike Shoe", "price": 41000, "qty": 14},
    {"product": "Adidas Shoe", "price": 45000, "qty": 7},
    {"product": "Fendi Bag", "price": 45000, "qty": 12},
    {"product": "Versace Shoe", "price": 45000, "qty": 5}
]
```

(6 mrks)

6. ABC Nig. Ltd is trying to build a machine learning classification model to predict customers level of satisfaction with their service. Already, a Machine Learning Engineer had segmented the datasets to be used and saved them as "XTrain.csv" and "yTrain.csv" for training and "XTest.csv" and yTest.csv" for testing. Provided that "numpy", "pandas", "matplotlib" and "scikit-learn" Python libraries have already been installed on your system.

Your Task:
Write Python instructions to

(i.) Import the appropriate libraries (**ii.)** load the datasets (**iii.)** Train the classification model "classifier" on the Xtrain and yTrain datasets. (**iv.)** Make prediction using the Xtest dataset and store results in "predictions" variable (**v.)** Using **Accuracy** as metric, evaluate the performance of the model by comparing the predictions made with yTest dataset.

(12 mrks)

7. a.) What do you understand by **function** in Python? **(4 mks)**
b.) Given that function "getSimpleInterest(principal, rate, time)" which calculates and returns a simple interest value, has already been defined. And the following contains data to be passed into the function:

```
dico =  {"principal": 120000, "time": 12, "rate": 3.7}
data = [150000, 5.3, 24]          # where: principal=150000, rate=5.3, time=24
```

Write a Python program that calls the getSimpleInterest(…) function,

- **i.** passing the data in the "dico" variable as argument to the function and stores result in "dico_result".
- **ii.** passing the values in the "data" variable as arguments to the function and stores the results into variable "data_result".

(8 mks)

I WISH YOU THE BEST OF LUCK!