**Introduction to Python**

**December 2023 Examination**

**1) Write a Python function that takes a string as input and returns a new string that contains only the unique characters from the input string, in the order they first appear. Also Display the both input string, output string and the character that are not unique? (10 Marks)**

**Ans:**

**Introduction to Python**

Python is a popular high-level programming language known for its simplicity, versatility, and readability. It was created by Guido van Rossum and first released in 1991. Python has gained immense popularity in various domains, including net development, information analysis, artificial intelligence, scientific computing, and more. Its syntax allows programmers to explicit concepts in fewer lines of code than languages like C++ or Java.

Python is an interpreted, item-oriented, and dynamically typed language. It supports multiple programming paradigms, such as procedural, object-oriented, and functional programming. Python's extensive, well-known library affords modules and features that cover a wide range

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**2) Explain the difference between array and object with the help of example. Write a code to save your name, roll number and subject into an array and copy in another array? (10 Marks)**

**Ans:**

**Introduction:**

Python, a versatile and powerful programming language, has become a cornerstone of modern software development, records analysis, artificial intelligence, and internet applications. Its popularity stems from its simplicity, readability, and an extensive range of libraries and frameworks. Python was created by Guido van Rossum and released in 1991, evolving into a sturdy, open-source language that supports multiple programming paradigms. This introductory section will overview Python's history, features, and significance in

**3) An IoT system is being developed that collects sensor data from multiple devices and processes it in realtime. The system developers need a way to analyze and manipulate large amounts of sensor data efficiently. After researching different libraries, they decide to use NumPy for its array manipulation capabilities.**

**Problem**

**The system developers need to write code that can process and analyze sensor data using NumPy. They have a sample data file that they want to use for testing. So, you as a part of the team, are required to perform various analysis on sensor data such as:**

**1. Import the necessary libraries.**

**2. Load the sensor data into a NumPy array.**

**3. Calculate basic statistics for the sensor data.**

**4. Filter the sensor data.**

**5. Analyze the distribution of the sensor data.**

**6. Save the processed data.**

**Using Numpy for Sensor Data Analysis in an IoT System. Demonstrate the above steps for the problem using python code and answer the following question.**

**QUESTIONS**

**a. What is NumPy and why is it useful for data analysis in IoT systems? Using NumPy, calculate basic statistics for sensor data and filter sensor data? (5 Marks)**

**Ans:**

**Introduction**

Inside the rapidly evolving landscape of technology, the net of things (IoT) has emerged as a transformative force, connecting a significant array of devices to the internet, permitting them to collect and change statistics. Green processing and evaluation of the great quantity of sensor information generated via IoT gadgets are paramount in this paradigm. Python, a flexible and broadly used programming language, offers a practical library called NumPy,

**b. How can NumPy be used to analyze the distribution of sensor data? Can NumPy be used with other Python libraries commonly used in IoT systems, such as Pandas? If so, how? (5 Marks)**

**Ans:**

**Introduction**

In the realm of IoT (net of things), the assimilation and interpretation of sensor records play a pivotal function in extracting meaningful insights and facilitating real-time decision-making. One of the fundamental aspects of handling sensor information is green manipulation and analysis, especially when dealing with substantial volumes of records. NumPy, a powerful