Q1. Explain the key features of Python that make it a popular choice for programming?

ANS. Python is a popular language because it is easy to read and write. It has a vast library of built-in tools, works on any operating system, and is used in many fields like web development, data science, and artificial intelligence.

EASY TO CODE - Python is a very high-level programming language, yet it is effortless to learn.

EASY TO READ - Python code looks like simple English words. There is no use of semicolons or brackets, and the indentations define the code block.

PORTABLE - Python is portable in the sense that the same code can be used on Operating system (OS). Suppose you write a Python code on a Mac. If you want to run it on Windows or Linux, you don't have to make any changes to it. As such, there is no need to write a program multiple times for several platforms.

In summary, Python's simplicity, versatility, and strong community make it a top choice for many programmers.

Q2. Describe the role of predefined keywords in Python and provide examples of how they are used in a Program?

ANS- Predefined keywords are used to define the structure and flow of a python program, these keywords help to implement control flow, define data structures, manage functions, and handle exceptions.

PREDEFINED KEYWORD -:

'False', 'None', 'True', 'and', 'as', 'assert', 'async', 'await', 'break', 'class', 'continue', 'def', 'del', 'elif', 'else', 'except', 'finally', 'for', 'from', 'global', 'if', 'import', 'in', 'is', 'lambda', 'nonlocal', 'not', 'or', 'pass', 'raise', 'return', 'try', 'while', 'with', 'yield']

****Please find examples attached jupyter notebook.**

Q.3 Compare and contrast mutable and immutable objects in Python with examples.

ANS – Mutable objects - Mutable objects are those whose statement can be changed after they are created.

Such as -: List, Dictionaries & sets.

Immutable - Immutable objects are those whose state cannot be changed once they are created.

Such as – Strings, tuples & Integers.

****Please find examples attached jupyter notebook.**

MUTABLE	IMMUTABLE
State can be changed after creation.	State cannot be changed after creation.
Can be modified in place.	Any modification results in a new object.
Generally efficient for modifications.	May require more memory for changes.
Requires careful handling.	Inherently safer due to immutability.
Collections that need to change over time.	Values that should remain constant.

Q.4 Discuss the different types of operators in Python and provide examples of how they are used.

ANS -: i. **Arithmetic Operator -** Perform mathematical operations.

Such as -: +, -, *, /, %, **, //

ii. **Comparison Operator -:** For compare the values of two conditions and return True or False.

Such as-: ==, !=, <, >, <=, >=

iii. **Logical Operator-:** Combine conditional operator.

Such as-: 'and', 'or', 'not'

iv. **Bitwise Operator-:** Perform bit-level operations on integers.

Such as-: '&'(AND), '|'(OR), '^'(XOR), '~'(NOT), << (LEFT SHIFT), >> (RIGHT SHIFT)

v. **Assignment Operators-:** used to assign values to variables.

Such as-: =, +=, -=, *=, /=, %=, **=, //=,

vi. **Identity Operators-:** Compare the memory locations of two objects.

Such as -: is, is not.

vii. **Membership Operator: -** Test if a sequence contains a certain element.

Such as: - in, not in.

Q.5 Explain the concept of type casting in Python with examples.

ANS- It is also known as type conversion. It has two types – Implicit Type Casting and Explicit Type Casting.

Implicit Type Casting	Explicit Type Casting
Performed automatically by Python.	Performed manually by the programmer.
Python automatically converts one data type to another without the programmer's intervention.	Requires using built-in functions to convert data types explicitly.

Implicit Type Casting – Python automatic converts smaller data types to larger data types to prevent data loss.

** Note please find example on attached jupyter notebook.

Explicit Type Casting – Performed manually by programmer.

** Note please find example on attached jupyter notebook.

Q.6 How do conditional statements work in Python? Illustrate with examples.?

ANS- Conditional Statements – It allow you to execute certain blocks of code based on their statement it gives you 'True' or False.

**** Please find examples in attached jupyter notebook.**

Q.7 Describe the different types of loops in python and their use cases with examples.

ANS- Loops are two types- FOR LOOP & WHILE LOOP.

for loop- It is useful when you know the number of iterations or want to process each item in a collection.

Uses of for loop – i. Processing items in a dictionary.

ii. Using ranges for repetitive tasks.

iii. Iterating over elements of a list or tuple.

While loop - A while loop repeats code as long as a condition is true, useful when the number of iterations is unknown and depends on the condition.

USES OF 'while loop' – i. Repeating an action until a certain condition is met.

ii. Reading user input until valid data is received.

****please find Examples on attached jupyter notebook.**