

Section 1: Multiple-Choice Questions (15x2 = 30)

1. Which of the following is a mutable data type in Python?
a) tuple b) str c) list d) int
2. What will be the output of the following expression: $4 + 3 * 2 ** 2$?
a) 28 b) 16 c) 20 d) 49
3. Which reserved keyword is used to start an exception handling block that catches errors?
a) raise b) assert c) except d) finally
4. What is the correct syntax for defining a custom function named calculate that takes two arguments?
a) function calculate(a, b):
b) def calculate[a, b]:
c) def calculate(a, b):
d) create function calculate(a, b):
5. Which list method is used to remove and return an element at a specified index?
a) .remove() b) .delete() c) .pop() d) .discard()
6. What is the result of slicing `my_tuple = (10, 20, 30, 40)` as `my_tuple[1:3]`?
a) (10, 20, 30) b) .delete() c) .pop() d) .discard()
7. What is a key feature of the set data type?
a) Allows duplicate elements
b) Stores data as key-value pairs
c) Elements are ordered by insertion
d) Elements must be unique
8. How many times will the `print()` statement execute?


```
i = 0
while i < 5:
    print("Hello")
    i += 2
```


a) 5 b) 4 c) 3 d) 2
9. If `my_dict = {'a': 1, 'b': 2}`, what happens when you try to access `my_dict['c']`?
a) It returns None.
b) It raises a `KeyError`.
c) It returns 0.
d) It adds `{'c': None}` to the dictionary.
10. Which built-in function is used to get the length (number of items) of a sequence?
a) `size()` b) `len()` c) `length()` d) `count()`

11. What is the purpose of the break statement inside a loop?
- a) Skips the current iteration and continues to the next.
 - b) Exits the loop entirely.
 - c) Skips the rest of the code in the function.
 - d) Restarts the loop from the beginning.
12. Which operator is used for floor division (integer division) in Python?
- a) /
 - b) //
 - c) div
 - d) %
13. Which type conversion function would you use to convert the string "123.45" into a number that retains the decimal part?
- a) int()
 - b) str()
 - c) float()
 - d) list()
14. Which of these is a Python reserved keyword?
- a) string
 - b) print
 - c) class
 - d) main
15. What is the outcome of `print("py" + "thon" * 2)`?
- a) pythonpython
 - b) python 2
 - c) pythonthon
 - d) pythontwo

Section 2: Short Answer Questions (10x3 = 30)

1. Explain the difference between the `is` operator and the `==` operator.
2. What is the key difference between a tuple and a list regarding mutability?
3. Give one advantage of using a set over a list when you need to store a collection of items.
4. Write a simple for loop that iterates over the keys of a dictionary named `inventory` and prints each key.
5. What is the purpose of the `else` block in an exception handling structure (`try...except...else`)?
6. Explain the concept of string formatting. Give a one-line example using an f-string.
7. Describe the role of the `return` statement within a custom function.
8. What is an `IndexError`, and what causes it in list/tuple/string slicing or indexing?
9. If you have a list `data = [1, 2, 3]`, what does `data.append([4, 5])` do to the list?
10. In conditional statements, what is the key difference in purpose between `elif` and a separate, new `if` statement?

Section 3: Problem Solving (2x20 = 40)

1. Function and Dictionary Problem
Write a Python function named `calculate_stats` that takes a list of numbers as its single argument. The function should calculate the sum and the average of the numbers in the list. Finally, it must return a dictionary with two key-value pairs: `'total_sum'` and `'average'`.
Example Call: `calculate_stats([10, 20, 30])`
Expected Output: `{'total_sum': 60, 'average': 20.0}`
2. String, Loop, and Conditional Problem
Write a Python program that prompts the user for a sentence. The program must then count the number of vowels (a, e, i, o, u, case-insensitive) in the sentence and print the final count.
Example:
User Input: "Learning Python is fun"
Expected Output: The total number of vowels is 6.