1. In the below elements which of them are values or an expression? eg:- values can be integer or string and expressions will be mathematical operators.

\* **- Expression**

'hello' **-Value**

-87.8 **-Value**

- **- Expression**

/ - **Expression**

* **- Expression**

6 **-Value**

2. What is the difference between string and variable?

**Variables are used to store data types while string is a data type itself. String also has to be enclosed in inverted commas while variables do not need to be enclosed in inverted commas.**

3. Describe three different data types.

**Strings: data types which can contain any characters and are enclosed in inverted commas**

**Lists: Store multiple different comma separated data types (like strings, numbers, Booleans). They are enclosed in square brackets.**

**Dictionary: Contains key-value pairs (key and value separated by colon symbol). These pairs are comma separated and dictionaries are enclosed by curly brackets {}**

4. What is an expression made up of? What do all expressions do?

**Expressions are made up of data types and operators, they are used to modify existing data types**

5. This assignment statements, like spam = 10. What is the difference between an expression and a statement?

6. After running the following code, what does the variable bacon contain?

bacon = 22

bacon + 1

**It contains the number 23.**

7. What should the values of the following two terms be?

'spam' + 'spamspam'

'spam' \* 3

**They both have the same value: “spamspamspam”**

8. Why is eggs a valid variable name while 100 is invalid?

**Variable names follow certain rules and they cannot start with a number, making 100 invalid.**

9. What three functions can be used to get the integer, floating-point number, or string version of a value?

**int() for integer**

**float() for floats**

**str() for strings**

10. Why does this expression cause an error? How can you fix it?

'I have eaten ' + 99 + ' burritos.'

**You cannot add strings and integer types together, to fix this change 99 to string by adding inverted commas around it. 'I have eaten ' + ‘99’ + ' burritos.'**

11. When would you choose between a list, set, and tuple in a data-heavy application?

**Lists are used for general lists of data that is changed frequently, dictionary is used if data forms pairs between each other and sets are used if the data cannot have duplicates and has only unique members**

12. What is the output of this code? Why?

data = [1, 2, 2, 3]

print(set(data))

print(tuple(set(data)))

**The output is:**

**{1, 2, 3}**

**(1, 2, 3)**

**This is because sets do not allow duplicate values (removing the 2) and then this set is then converted to a tuple (which will have the same values as the set)**

13.Which data structure would you use for storing timestamped logs for fast searching and retrieval?

**List data type**

14. Which data type fits best for representing sensor data like (lat, long, temperature)?Why?

**Dictonary is best because you can store the attribute (lat, long or temp) as a key then the numerical values the value**

15. When would you choose bytearray over bytes?

16. Explain mutability of list, tuple, dict, and set. Why does immutability matter in multithreading?

**Lists are mutable, Tuple is immutable, Dictionary is mutable, and set is mutable**

***haven’t covered multithreading***

17. Should you use a list or tuple to store a constant list of countries in an API?

**Tuple as the list of countries is fixed and not open to change**

18. You want to store all unique product IDs from a CSV. Which data type do you use?

**You can use a list and each value can become each element of the list.**

19. Print the given strings as per stated format.

Given strings: "Data" "Science" "Program"

Output: Data-Science-Program

**d = “-“**

**print(“Data” + d + “Science” + d + “Program”)**

20. Print the given strings "Python", "Is", "Fun" in the format below using the print() function:

Output: Python\*\*\*Is\*\*\*Fun

**a = “\*\*\*”**

**print(“Python” + a + “Is” + a + “Fun”)**