

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
DEPARTMENT OF MATHEMATICS AND STATISTICS**

MA522M-Data Science Programming Laboratory

Exercise-2 Duration: 60 Minutes P1 Slot 11:30-12:30
18 January 2025 Practical 3 Marks

Answer All Questions. Usage of Internet is not Allowed

1. Verify the following identity is true or not [0.25]

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\frac{\sin x}{x} \approx 1, x \approx 0$$

2. Fruits List [5 × 0.2 = 1]

- (a) Write a Python program to display the first and last items from the following list.

Unit Test:

```
fruits=['Apple', 'Orange', 'Grapes', 'Banana', 'Papaya']
```

- (b) Write a python program to display the length of this list **Output:** 5

- (c) Append the fruit kiwi and lemon to fruits list. Remove the Grapes from the list. Print the list again.

- (d) Sort the fruits in ascending order and print. Sort the fruits in descending order and print.

3. Mathematics and Statistics Courses Set [4 × 0.25 = 1]

- (a) Write a Python program to create two sets called Mathematics and Statistics

Unit Test:

```
Mathematics={'Algebra', 'Analysis', 'Geometry', 'Probability', 'Topology'}
```

```
Statistics={'Bayesian', 'Stochastic', 'Inference', 'Probability'}
```

- (b) Write a Python program to display the length of the set. Update another five topics in Mathematics

- (c) Update Calculus in Mathematics and Statistics. Find a similar topic and update in both.

- (d) Find the intersection, union, set difference, symmetric difference of Mathematics and Statistics

4. Books Author Dictionary [3 × 0.25 = 0.75]

- (a) Write a Python program to create a dictionary called books_author

Unit Test:

```
books_author={'Analysis': 'Rudin', 'Algebra': 'Herstein', 'Python': 'Rossom'}
```

- (b) Write a Python program to display the length of the dictionary. Get at least another five book names from the user and their author name, and update the values in the list.

- (c) Display the list of authors available. Get the number of books written by same author