**✅ Model Answers for Python, Maths, EDA & ML Theory Exam**

**🔹 Questions 1–25:**

**1. What is a variable in Python?**  
A variable is a container that stores data.  
*Example:* x = 10

**2. How do you create a list in Python?**  
Use square brackets.  
*Example:* my\_list = [1, 2, 3]

**3. What does the print() function do in Python?**  
It displays output on the screen.  
*Example:* print("Hello")

**4. Difference between a string and a number in Python:**  
A string is text like "apple", while a number is an integer (10) or float (3.14).

**5. What is a loop in Python? Name two types.**  
A loop repeats code. Types: for loop and while loop.

**6. How do you add an element to a list in Python?**  
Use append().  
*Example:* my\_list.append(4)

**7. What is the purpose of the len() function?**  
It returns the number of items.  
*Example:* len("apple") → 5

**8. How do you write a comment in Python?**  
Use # symbol.  
*Example:* # This is a comment

**9. Difference between input() and print():**  
input() takes user input, print() shows output.

**10. What does the range() function do?**  
Generates a sequence of numbers.  
*Example:* range(5) → 0 to 4

**11. How do you check if an element is in a list?**  
Use in.  
*Example:* 2 in [1, 2, 3]

**12. What is a Python dictionary?**  
A key-value data structure.  
*Example:* {"name": "John", "age": 25}

**13. What is the mean of a set of numbers?**  
The average value (sum divided by count).

**14. How do you calculate the sum of a list?**  
Use sum().  
*Example:* sum([1, 2, 3]) → 6

**15. What is a percentage and how is it calculated?**  
Part out of 100.  
*Formula:* (part/whole) × 100

**16. What does “slope” mean in a linear equation?**  
Rate of change (rise over run).

**17. What is a square number?**  
A number multiplied by itself.  
*Examples:* 4 (2×2), 9 (3×3)

**18. What is a graph in mathematics?**  
A visual representation of data or equations.

**19. Difference between addition and multiplication:**  
Addition adds values; multiplication is repeated addition.

**20. What is a fraction?**  
Part of a whole.  
*Example:* 1/2

**21. What does “average” mean in math?**  
Sum of values divided by the number of values.

**22. Purpose of a coordinate system:**  
To locate points using (x, y).

**23. What does a linear equation look like?**  
*Form:* y = mx + b

**24. Difference between positive and negative numbers:**  
Positive > 0, negative < 0.

**25. What is the median of a dataset?**  
The middle value in sorted data.

**🔹 Questions 26–50:**

**26. What is a dataset?**  
A collection of data in rows and columns (like a table).

**27. What does a bar chart show?**  
Comparison among categories using bars.

**28. Purpose of a histogram:**  
Shows distribution of numerical data.

**29. How to find missing values in a dataset?**  
Use isnull() in Python.  
*Example:* df.isnull().sum()

**30. What is a table in data analysis?**  
Structured format with rows and columns.

**31. What is a column in a dataset?**  
A vertical set of data values.

**32. What is a scatter plot used for?**  
Shows relationship between two numeric variables.

**33. What is data cleaning?**  
Removing or correcting incorrect or missing data.

**34. Purpose of sorting data:**  
To organize it for better understanding and analysis.

**35. What is a row in a dataset?**  
One record or entry of data.

**36. How to count items in a column?**  
Use len() or .count()  
*Example:* len(df["column"])

**37. What is a line plot?**  
Shows data trends over time with connected lines.

**38. What is machine learning?**  
A method where computers learn from data.

**39. Example of ML application:**  
Email spam detection.

**40. Difference between training and testing data:**  
Training is for learning, testing is for evaluation.

**41. What is a model in ML?**  
A program that makes predictions based on data.

**42. Two types of supervised learning tasks:**  
Classification and regression.

**43. What is unsupervised learning? Example?**  
Learning without labels.  
*Example:* Clustering.

**44. What is a prediction in ML?**  
The output of a model based on input data.

**45. What is an algorithm in ML?**  
A method or formula used to learn from data.

**46. Purpose of a decision tree:**  
To make decisions using a flowchart-like structure.

**47. What does accuracy mean in ML?**  
Percentage of correct predictions.

**48. One way to improve an ML model:**  
Add more data or tune hyperparameters.

**49. What is a feature in a dataset?**  
An input variable used in prediction.

**50. What is clustering in ML?**  
Grouping similar data points without labels.