## Batch 04

**Module A – Set 01**

**Answers and Justifications**

## Question 1: Smart Fridge Temperature Control

Correct Answer: A

Justification: Correctly checks for presence using 'or'. B and D are logically incorrect; C uses wrong syntax.

## Question 2: E-Voting System Data Validation

Correct Answer: A, C

Justification: Correctly validates age, length, and alphanumeric. B misses alphanumeric; D misses age check.

## Question 3: Coffee Machine Loop Count

Correct Answer: 30

Justification: 300 seconds / 10 = 30 iterations.

## Question 4: Weather Data File Logging

Correct Answer: C

Justification: 'a' mode appends data without overwriting.

## Question 5: Personalized Greeting Input

Correct Answer: A, B, D

Justification: All correctly use input; C uses 'raw\_input' which is Python 2, older version

## Question 6: List vs Tuple for Weekly Menu

Correct Answer: B

Justification: Tuple is immutable; suitable for fixed data.

## Question 7: Ride Sharing App (Dictionary)

Correct Answer: A, B

Justification: Both correctly access dictionary values.

## Question 8: Inheritance: Class Hierarchy

Correct Answer: C

Justification: Dog overrides Animal's method. Outputs 'Generic sound Bark'.

## Question 9: Median Calculation

Correct Answer: A

Justification: Sorted array: [2,4,6,8,10]; median = 6.

## Question 10: Markov Chain Matrix Multiplication

Correct Answer: A

Justification: [1,0] \* transition = [0.7 0.3].

## Question 11: Sorting App Ratings (Insertion Sort)

Correct Answer: B

Justification: Insertion sort is efficient for nearly sorted datasets; avoids unnecessary comparisons.

## Question 12: Movie Search Feature (Binary Search)

Correct Answer: B

Justification: Sorted data allows efficient binary search; O(log n) complexity.

## Question 13: Baker’s Problem (Matrix Multiplication)

Correct Answer: B

Justification: Matrix multiplication models batch computation of ingredients.

## Question 14: Robotics Arm Movement (Vector Magnitude)

Correct Answer: B

Justification: np.linalg.norm computes vector magnitude.

## Question 15: Matrix Operations in AI

Correct Answer: A, B, C, D

Justification: All are valid matrix operations in NumPy.

## Question 16: AI Model Accuracy (Probability)

Correct Answer: B

Justification: 0.9^3 = 0.729; independent events.

## Question 17: Ride Time Analysis (Mode)

Correct Answer: A

Justification: 10 occurs twice; mode = most frequent value.

## Question 18: Data Spread (Std Dev)

Correct Answer: A

Justification: Higher std dev = greater data variability.

## Question 19: Numpy Array Operations

Correct Answer: A, B, C

Justification: All valid; arr / 0 causes division error.

## Question 20: Dictionary: Counting Words

Correct Answer: C

Justification: 'AI' and 'is' both appear twice.

## Question 21: Sales Analysis with Pandas

Correct Answer: B

Justification: pd.read\_csv is used to load CSV files into a DataFrame.

## Question 22: Data Visualization (Matplotlib)

Correct Answer: A, C

Justification: plt.bar and df.plot(kind='bar') correctly create bar charts.

## Question 23: Seaborn Visualization

Correct Answer: B

Justification: sns.histplot shows distribution of numeric data.

## Question 24: Encapsulation in OOP

Correct Answer: B

Justification: Encapsulation restricts access by wrapping data in classes.

## Question 25: Object Design for E-Commerce System

Correct Answer: A, B, C

Justification: Only place\_order() belongs in Order; not Product.

## Question 26: Basic Operations

Correct Answer: B

Justification: In both the cases, comparison is the basic operation

## Question 27: Grocery and Discounting

Correct Answer: C

Justification: The value will be 1035 after discounting. 1150 with a 10% discount.

## Question 28: Transition Matrix Validity

Correct Answer: B

Justification: Rows in transition matrices sum to 1.

## Question 29: Hypothesis Testing - Z Test

Correct Answer: B

Justification: p < alpha; reject null hypothesis.

## Question 30: Type I and Type II Error

Correct Answer: B

Justification: Type I error is rejecting a true null hypothesis.