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.