# **📊 Interactive Quiz: Matplotlib & Probability**

**Instructions:**

* Answer MCQs by writing the option letter.
* For coding questions, write Python code.
* For interpretation questions, explain briefly.

## **🔹 Section 1: Matplotlib Basics**

**Q1.** Which library is used for creating plots in Python?  
A. NumPy  
B. Pandas  
C. Matplotlib  
D. TensorFlow

Answer: C. Matplotlib

**Q2.** Which function is used to create a simple line plot?  
A. plt.draw()  
B. plt.line()  
C. plt.plot()  
D. plt.graph()

Answer: C. plt.plot()

**Q3. Coding Question:**Write code to plot the following data:

x = [1,2,3,4,5]

y = [2,4,6,8,10]

Add:

* Title: "Simple Line Plot"
* X label: "X values"
* Y label: "Y values"

Answer: import matplotlib.pyplot as plt

x = [1, 2, 3, 4, 5]

y = [2, 4, 6, 8, 10]

plt.plot(x, y)

plt.title("Simple Line Plot")

plt.xlabel("X values")

plt.ylabel("Y values")

plt.show()

**Q4.** Which function displays the plot?  
A. plt.display()  
B. plt.show()  
C. plt.render()  
D. plt.output()

Answer: B. plt.show()

## **🔹 Section 2: Types of Charts**

**Q5.** Which chart is best to show frequency distribution?  
A. Pie chart  
B. Histogram  
C. Line chart  
D. Scatter plot

Answer: B. Histogram

**Q6. Coding Question:**Create a histogram using random exam scores between 0 and 100.

Code:

import numpy as np

import matplotlib.pyplot as plt

scores = np.random.randint(0, 101, 100)

plt.hist(scores, bins=10)

plt.title("Histogram of Exam Scores")

plt.xlabel("Scores")

plt.ylabel("Frequency")

plt.show()

**Q7.** Which chart shows relationship between two variables?  
A. Scatter plot  
B. Pie chart  
C. Histogram  
D. Bar chart

Answer: A. Scatter plot

**Q8. Coding Question:**Create a scatter plot of:

hours\_studied = [1,2,3,4,5]

marks = [40,50,65,70,85]

Code:

import matplotlib.pyplot as plt

hours\_studied=[1,2,3,4,5]

marks=[40,50,65,70,85]

plt.scatter(hours\_studied,marks)

plt.title("Hours Studied vs Marks")

plt.xlabel("Hours Studied")

plt.ylabel("Marks")

plt.show()

## **🔹 Section 3: Probability Basics 🎲**

**Q9.** Probability value always lies between:  
A. −1 and 1  
B. 0 and 1  
C. 1 and 10  
D. 0 and 100

Answer: B. 0 and 1

**Q10.** Probability of getting a head when tossing a fair coin:  
A. 0  
B. 0.25  
C. 0.5  
D. 1

Answer: C. 0.5

**Q11. Coding Question:**Simulate tossing a coin 100 times using NumPy and plot the results using a bar chart.

Code:

import numpy as np

import matplotlib.pyplot as plt

tosses=np.random.choice(["Head","Tail"],100)

heads=np.sum(tosses=="Head")

tails=np.sum(tosses=="Tail")

plt.bar(["Head","Tail"],[heads,tails])

plt.title("Coin Toss Simulation (100 Tosses)")

plt.xlabel("Outcome")

plt.ylabel("Count")

plt.show()

## **🔹 Section 4: Distributions**

**Q12.** Which distribution is used for coin toss outcomes?  
A. Normal  
B. Binomial  
C. Uniform  
D. Exponential

**Q13. Coding Question:**Generate 1000 random numbers from a normal distribution and plot histogram.

Code:

import numpy as np

import matplotlib.pyplot as plt

data=np.random.normal(0,1,1000)

plt.hist(data,bins=20)

plt.title("Normal Distribution (1000 Samples)")

plt.xlabel("Value")

plt.ylabel("Frequency")

plt.show()

**Q14. Interpretation Question:**If a histogram looks bell-shaped, which distribution is it?

Answer: If a histogram looks bell-shaped, it represents a normal distribution.

## **🔹 Section 5: Real-World Scenario 📈**

A company recorded website visitors per day:

visitors = [120, 135, 150, 160, 180, 200, 210]

**Q15. Coding Question:**Create a line chart showing visitor trend.

Code:

import matplotlib.pyplot as plt

visitors=[120,135,150,160,180,200,210]

plt.plot(visitors)

plt.title("Website Visitors Trend")

plt.xlabel("Day")

plt.ylabel("Number of Visitors")

plt.show()

**Q16. Interpretation:**If visitor numbers increase steadily, what does it indicate?

A. Declining traffic  
B. Stable traffic  
C. Growing traffic  
D. Random traffic

Answer: C. Growing traffic

## **🔹 Section 6: Advanced Thinking**

**Q17.** Which plot is best to visualize probability distribution shape?  
A. Histogram  
B. Line plot  
C. Pie chart  
D. Bar chart

Answer: A. Histogram