
📊 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

Ans : 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()

Ans : 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"

Solution :

```
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()

Ans : 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

Ans : B. Histogram

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

Solution :

```
import numpy as np

import matplotlib.pyplot as plt

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

plt.hist(scores)

plt.title("Exam Score Distribution")

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

Ans : A. Scatter plot

Q8. Coding Question:
Create a scatter plot of:

hours_studied = [1,2,3,4,5]
marks = [40,50,65,70,85]

Solution :

```
import matplotlib.pyplot as plt

hours_studied = [1,2,3,4,5]
marks = [40,50,65,70,85]

plt.scatter(hours_studied, marks)
plt.xlabel("Hours Studied")
plt.ylabel("Marks")
plt.title("Hours vs 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

Ans : 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

Ans : C. 0.5

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

Solution :

```
import numpy as np

import matplotlib.pyplot as plt

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

unique, counts = np.unique(tosses, return_counts=True)

plt.bar(unique, counts)

plt.title("Coin Toss Results (100 Trials)")

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

Ans : B. Binomial

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

Solution :

```
import numpy as np

import matplotlib.pyplot as plt

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

plt.hist(data, bins=30)

plt.title("Normal Distribution Histogram")

plt.xlabel("Value")

plt.ylabel("Frequency")

plt.show()
```

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

Ans : 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.

Solution :

```
import matplotlib.pyplot as plt

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

plt.plot(visitors)

plt.title("Website Visitor Trend")

plt.xlabel("Days")

plt.ylabel("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

Ans : 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

Ans : A. Histogram