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## Interactive Quiz: Matplotlib & Probability

### Instructions:

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

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**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()

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**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()
```

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**Q4. Which function displays the plot?**

- A. plt.display()
- B. plt.show()
- C. plt.render()
- D. plt.output()

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**Answer:** B. plt.show()

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## ◆ 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

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**Q6. Coding Question:**

Create a histogram using random exam scores between 0 and 100.

**Answer:**

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

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

```
plt.hist(scores, bins=10)
```

```
plt.title("Exam Score Distribution")
```

```
plt.xlabel("Scores")
```

```
plt.ylabel("Frequency")
```

```
plt.show()
```

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**Q7.** Which chart shows relationship between two variables?

- A. Scatter plot
- B. Pie chart

- C. Histogram
- D. Bar chart

**Answer:** A. Scatter plot

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**Q8. Coding Question:**

Create a scatter plot of:

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

**Answer:**

```
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()
```

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◆ **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

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**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

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**Q11. Coding Question:**

Simulate tossing a coin 100 times using NumPy and plot the results using a bar chart.

**Answer:**

```
import numpy as np  
  
import matplotlib.pyplot as plt  
  
  
tosses = np.random.choice(["Head", "Tail"], size=100)  
unique, counts = np.unique(tosses, return_counts=True)  
  
  
plt.bar(unique, counts)  
plt.title("Coin Toss Results (100 Tosses)")  
plt.xlabel("Outcome")  
plt.ylabel("Frequency")  
plt.show()
```

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◆ **Section 4: Distributions**

**Q12.** Which distribution is used for coin toss outcomes?

- A. Normal
- B. Binomial
- C. Uniform
- D. Exponential

**Answer:** B. Binomial

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**Q13. Coding Question:**

Generate 1000 random numbers from a normal distribution and plot histogram.

**Answer:**

```
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")  
plt.xlabel("Value")  
plt.ylabel("Frequency")  
plt.show()
```

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**Q14. Interpretation Question:**

If a histogram looks bell-shaped, which distribution is it?

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**◆ 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.

**Answer:**

```
import matplotlib.pyplot as plt
```

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

```
plt.plot(visitors)  
plt.title("Website Visitor Trend")  
plt.xlabel("Day")  
plt.ylabel("Visitors")  
plt.show()
```

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**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

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◆ **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**

Histogram best visualizes distribution shape and probability spread.