

**1. What is Data Visualization? Why Do We Use It?**

1. What is data visualization?
2. Why is data visualization better than reading raw data?
3. What is the goal of data visualization?
4. Name 3 fields where data visualization is used daily.
5. What are some popular chart types?
6. What does a dashboard typically contain?
7. How can visualizing data reveal hidden patterns?
8. What is the role of data visualization in business?
9. What are some real-world uses of charts?
10. Name three popular data visualization tools (not just Python).

**2. Introduction to Matplotlib**

1. What is Matplotlib?
2. Who created Matplotlib?
3. Why is Matplotlib popular in Python?
4. How do you install Matplotlib?
5. What is the standard way to import Matplotlib?
6. What does pyplot mean in Matplotlib?
7. What are the key components of a Matplotlib plot?
8. What is a Figure in Matplotlib?
9. What is an Axes?
10. What is the difference between Axis and Axes?

**3. Understanding pyplot**

1. What is pyplot in Matplotlib?
2. How is pyplot different from full Matplotlib?
3. What is plt.plot() used for?
4. What does plt.show() do?
5. How do you save a figure using pyplot?
6. How do you create a simple line graph with pyplot?
7. Why is plt.show() necessary in scripts?
8. What happens if you forget plt.show()?
9. How do you avoid overlapping plots?
10. Can we plot without pyplot?

**4. Plotting Line Graphs**

1. How do you plot a line graph?
2. How do you plot two lines on the same graph?
3. How do you change the line color?
4. What argument is used for line style?
5. What values can linestyle take?
6. How do you add markers to a line?
7. What are valid marker styles?
8. How do you change the line thickness?
9. How to plot a time series with dates on X-axis?
10. Can you plot NumPy arrays directly?

**5. Labels, Titles, Legends, Grids**

1. How do you set the title of a graph?
2. How to label the X-axis?
3. How to label the Y-axis?
4. Why do we need a legend?
5. How do you create a legend?
6. How do you change legend position?
7. What are valid values for loc in plt.legend()?
8. How do you add a grid to your graph?
9. Can you customize grid lines?
10. How to hide X or Y grid only?

**6. Colors, Styles, Markers**

1. How to use named colors in plots?
2. Can we use HEX color codes?
3. What is an RGB tuple in Matplotlib?
4. What does markerfacecolor do?
5. What does markeredgecolor do?
6. How do you change marker size?
7. How do you make a dashed red line with circle markers?
8. Can you combine style, marker, and color in one line?
9. How do you set default styles for all plots?
10. How do you reset styling?

**7. Bar Charts, Pie Charts, Histograms**

1. How do you create a vertical bar chart?

2. How to make a horizontal bar chart?
3. How do you set bar color and edge color?
4. What is a grouped bar chart?
5. How do you plot grouped bars?
6. How to stack bars on top of each other?
7. How do you add values on top of bars?
8. How to draw a pie chart?
9. How do you add percentages to a pie chart?
10. What is the explode parameter in pie charts?
11. How to add a shadow effect to pie chart?
12. What is a histogram?
13. When should you use a histogram?
14. How do you plot a histogram?
15. What does the bins parameter control?
16. How to change histogram color and transparency?
17. How do you interpret histogram bars?
18. What is frequency distribution?

**8. Subplots and Layout Adjustments**

1. What are subplots?
2. What is the syntax of `plt.subplot()`?
3. What's the difference between subplot and subplots()?
4. How to create 2x2 grid of subplots?
5. How do you set figure size using subplots()?
6. What is `tight_layout()` used for?
7. What if subplots overlap?
8. How to manually adjust subplot spacing?
9. What does `wspace` and `hspace` mean?
10. How do you share X or Y axis between subplots?
11. How to set a single title for all subplots?

**9. Saving Figures**

1. How do you save a plot as an image?
2. What file types can `savefig()` use?
3. What does dpi mean?
4. How to save high-resolution plots?
5. What is `bbox_inches='tight'`?

6. How to save without showing the plot?
7. Can you save only part of a figure?
8. How do you specify a save path?
9. Can you save vector graphics (PDF, SVG)?
10. How to save a figure from subplots?

**11. Interview Questions (Advanced)**

1. What are common errors in Matplotlib?
2. Why use pyplot instead of full object-oriented API?
3. When would you use object-oriented plotting?
4. Difference between `ax.plot()` and `plt.plot()`?
5. What is the role of `fig`, `ax = plt.subplots()`?
6. How can you customize ticks?
7. What are ticks and tick labels?
8. How to rotate X-axis labels?
9. How to hide axis completely?
10. How to add annotation or text on a graph?
11. What are gridlines and why important?
12. What does `plt.xticks()` do?
13. How do you style fonts in titles or labels?
14. How do you create multi-page plots?
15. What is the benefit of vector vs raster formats?
16. How can you plot real-time (live) data?
17. What is interactive mode in Matplotlib?
18. How do you handle large datasets in plots?
19. What is `figure()` and why would you use it?
20. What's the difference between interactive and script mode?
21. How to set global plot settings?
22. Can you embed plots in Tkinter or Flask apps?
23. How to draw plots in Jupyter Notebook inline?
24. What's `%matplotlib inline`?
25. Difference between `plt.axis()` and `plt.axes()`?
26. What are some alternatives to Matplotlib?
27. Why do some plots look blurry?
28. How to improve plot resolution?
29. How to control aspect ratio?
30. How do you create a custom color palette?
31. Can you plot on existing axes?

32. What does `ax.set()` do?
33. What is `figure.add_subplot()`?
34. How to invert an axis?
35. Can you create animations with Matplotlib?
36. What's the use of `ax.text()`?
37. How to draw vertical/horizontal lines on plots?
38. What is a twin axis and how to create it?
39. How do you combine bar and line in one plot?
40. What makes a plot visually effective in presentations?