# Assignment Solutions – Unit 5 – Data Visualization using Python

Model answers:

1. Explain the role of Matplotlib in Python for data visualization.

Matplotlib is a widely‑used Python library for creating static, animated and interactive visualisations. It provides functions to generate line plots, bar charts, scatter plots, histograms and more. By customising colours, markers, labels and layouts, analysts can convey complex information clearly and professionally.

1. Provide a code snippet to create a line plot and a scatter plot using Matplotlib.

import matplotlib.pyplot as plt  
x = [1, 2, 3, 4, 5]  
y = [1, 4, 9, 16, 25]  
# Line plot  
plt.figure()  
plt.plot(x, y, marker='o')  
plt.title('Line Plot')  
plt.xlabel('X')  
plt.ylabel('Y')  
plt.show()  
# Scatter plot  
plt.figure()  
plt.scatter(x, y)  
plt.title('Scatter Plot')  
plt.xlabel('X')  
plt.ylabel('Y')  
plt.show()

1. Describe how to customise figure size, axis limits and labels in Matplotlib.

Specify figure size using plt.figure(figsize=(width, height)) in inches; set axis limits using plt.xlim(min\_x, max\_x) and plt.ylim(min\_y, max\_y); label axes with plt.xlabel(‘X’) and plt.ylabel(‘Y’) and add a title using plt.title(‘My Chart’).

1. How can you save a plot in different formats using Matplotlib?

After creating a plot, call plt.savefig(‘filename.png’) to save the current figure as a PNG file. Changing the file extension saves in other formats (e.g. .pdf or .svg). Use the dpi parameter to set resolution, e.g. plt.savefig(‘plot.png’, dpi=300).

1. What are interactive visualisations, and which Matplotlib feature allows them?

Interactive visualisations allow users to zoom, pan or update plots dynamically. Matplotlib provides widgets such as sliders and buttons through matplotlib.widgets to enable basic interactivity. Libraries built on Matplotlib like Plotly and Bokeh offer more advanced interactive capabilities.