**Manufacturing Quality Control with Control Charts – Q&A**

**1. What is the main goal of the project on control charts?**  
The project aims to enhance manufacturing quality control by applying statistical control charts to monitor, identify, and reduce process variations.

**2. Why is quality control important in manufacturing?**  
Quality control ensures that products consistently meet standards. It helps reduce waste, avoid costly defects, and improve customer satisfaction.

**3. How do control charts support quality control?**  
Control charts monitor process data over time, distinguishing between normal and unusual variations. This helps detect issues early and supports proactive quality management.

**4. What are P-charts and when are they used?**  
P-charts are used to monitor the proportion of defective items in samples. They are ideal for processes where each unit is either conforming or defective.

**5. What is the role of C-charts in process monitoring?**  
C-charts are used to monitor the number of defects per unit. They are useful when sample sizes are constant and a single unit may have multiple defects.

**6. How do X̄ and R charts function in quality control?**  
X̄ & R charts track the process average and range for continuous data. They help detect shifts in process mean and variations in spread, respectively.

**7. What tools were used for data analysis in this project?**  
Python, Excel, and Minitab were used for data processing, statistical modeling, and generating control charts to analyze manufacturing performance.

**8. What did the P-chart reveal in the analysis?**  
The P-chart showed mostly stable data but flagged a defect spike on Day 25, indicating an assignable cause needing investigation and corrective action.

**9. What insights did the X̄ & R charts provide?**  
These charts revealed a downward trend in the process mean and occasional spikes in variability, suggesting issues like tool wear or calibration drift.

**10. What are the key recommendations from this project?**  
The project recommends regular monitoring with control charts, process improvements based on root cause analysis, and staff training on statistical process control.