Theme: Mastering the AI Toolkit
Part 1: Theoretical Understanding

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1. Short Answer Questions

Q1: Explain the primary differences between TensorFlow and PyTorch. When would you choose one over the other?

- TensorFlow is good for deployment, production and static graph.
- PyTorch is more flexible, preferred in research and dynamic graph.

When to use one over the other:

- I would use TensorFlow for large scale production or mobile/edge deployment.
- I would use PyTorch for fast experimentation and research.

Q2: Describe two use cases for Jupyter Notebooks in AI development.

- Ideal for step-by-step prototyping and visualization.
- Supports interactive data exploration and model debugging.

Q3: How does spaCy enhance NLP tasks compared to basic Python string operations?

- spaCy uses linguistic models; it can detect POS, entities, etc.
- Python string operations use only basic pattern matching.

2. Comparative Analysis: Scikit-learn vs TensorFlow

Feature	**Scikit-learn**	**TensorFlow**
Target Applications	Classical ML (e.g. regression, SVM)	Deep Learning (e.g. CNN, RNN)

Ease of Use	Very beginner-friendly	Moderate to advanced
Community Support	Strong	Very strong with large ecosystem
Best Use Case	Quick ML tasks with small datasets	Scalable models for production