Part 1 — Chronology of AI

Write one real-world example for each stage:

Machine Learning: Email spam filter that learns from labeled spam vs. not-spam.

Deep Learning: A neural network that classifies photos on a smartphone (e.g., portrait vs. landscape).

Computer Vision: Face-unlock on phones that detects and matches faces in images.

NLP (Natural Language Processing): A chatbot that answers customer support questions.

LLMs (Large Language Models): ChatGPT-style assistant that composes human-like text and drafts emails.

Part 2 — Deep Learning Architectures

Use cases and matching:

1. RNN → Early speech-to-text systems

2. LSTM → Text translation

3. CNN → Image recognition

4. Transformer → Predicting the next word in ChatGPT.

Part 3 — Frameworks

Choose one and one-sentence reason (for a student making a cat-vs-dog classifier):

Keras : I’d use Keras because it has a simple, high-level API and fast prototyping for beginners, making it easy to build and train a cat-vs-dog classifier.

Part 4 — Evaluation Metrics (spam filter example)

Precision: If it marks 10 emails as spam and 7 are truly spam →

Precision = 7 / 10 = 0.70 (70.00%).

Recall: If there were 12 spam emails in total and your system caught 7 of them →

Recall = 7 / 12 ≈ 0.58 (58.33%).

F1 score:

With P = 0.70 and R ≈ 0.5833, F1 ≈ 0.64 (rounded to 2 decimals).

MSE / MAE: Actual age = 15, prediction = 18 → error = 3.

MSE = .

MAE = .

Which punishes error more? MSE penalizes larger errors more strongly because it squares the error.

BLEU / ROUGE:

Reference: “The cat sat on the mat”

Candidate: “Cat is on the mat.”

Which metric gives a higher score? ROUGE (recall-based overlap) would likely give a higher score than BLEU here, because ROUGE emphasizes recall of reference n-grams and the candidate contains most of the same content; BLEU (precision + brevity penalty) can be stricter.

Part 5 — Responsible AI & Explainability

Customer asks: “Why was my loan rejected?”

Your credit score was lower than the minimum required for this loan