Part 1: Theoretical Analysis (AI FUTURE)

1. Essay Questions

- **Q1**: Explain how **Edge AI** reduces latency and enhances privacy compared to cloud-based AI. Provide a real-world example (e.g., autonomous drones).

1. How it Reduces Latency:

    a. Data is processed locally, so there's no delay caused by sending data to the cloud and waiting for a response.
    b. This results in real-time decision-making, which is critical in time-sensitive environments like self-driving cars or industrial automation.

2. How it Enhances Privacy**:**

    a. Since data doesn't have to be sent to remote servers, sensitive information like faces, voices remains on the device.
    b. This reduces the risk of data breaches and improves compliance with privacy laws like GDPR or HIPAA

3. Real-world example:

    Edge AI allows surveillance cameras to detect threats (e.g. weapons, suspicious behavior) in real-time without sending data to the cloud.
    a. Low Latency: Instant alerts to security teams without internet delay.
    b. Enhanced Privacy: Face recognition happens on-device, keeping personal data secure.

- **Q2**: Compare Quantum AI and classical AI in solving optimization problems. What industries could benefit most from Quantum AI?

Classical AI:

a. Uses binary computing
b. Solves optimization problems using heuristics and gradient descent.

Quantum AI:

a. Leverages quantum computing principles like superposition and entanglement.
b. Can evaluate many solutions simultaneously**.**

Example – Optimization Problem:

a. Classical AI**:** Finding the shortest route for 50 delivery trucks it is very slow.
b. Quantum AI: Can explore millions of permutations in parallel, potentially solving in seconds what classical systems take hours**.**

Industries That Could Benefit Most:

a. Logistics like route optimization – DHL.
b. Finance like portfolio optimization, fraud detection.

- **Q3**: Discuss the societal impact of **Human-AI collaboration** in healthcare. How might it transform roles like radiologists or nurses?

Societal Impact:

Human-AI collaboration in healthcare combines machine intelligence with human judgment. This synergy leading to faster patient service, better diagnosis accuracy.

Transformation of Healthcare Roles:

1. **Radiologists:**
    a. AI can pre-analyze scans like X-rays and flag abnormalities.
    b. Radiologists shift from image reading to decision oversight, consulting on complex cases and patient interactions.
2. **Nurses:**
    a. AI-powered tools can monitor vital signs and alert nurses in real-time.
    b. Chatbots and robots assist with routine tasks.

2. Case Study Critique

- **Topic**: *AI in Smart Cities*
    - Read: AI-IoT for Traffic Management.
    - Analyze: How does integrating AI with IoT improve urban sustainability? Identify two challenges (e.g., data security).

1. Reduced Traffic Congestion
    a. AI processes real-time data from IoT sensors like traffic lights, GPS.
2. Efficient Public Transport
    a. AI predicts demand and optimizes routes or timing using IoT data.

Challenges

a. Cybersecurity Threats: AI-powered transportation systems are vulnerable to hacking and cyber-attacks.
b. Job Displacement: AI automation may replace human drivers and transport workers.
c. Data Privacy Issues: AI-driven systems collect and process vast amounts of personal data.