# PROVA 1 - A

QUESTION 1:
Explain in your own words what Reinforcement Learning is. In your answer, be sure to mention the following concepts: a) Agent; b) Environment; and c) Reward. Give an example that is a good example of Reinforcement Learning use to solve problems inside the energy industry. Please provide me with an EXCELLENT technical paper on this problem, one that is different from those selected by other students.


QUESTION 2:
In real-time electricity markets, prices fluctuate constantly due to factors like demand shifts, renewable energy supply, and grid congestion. A power trader—such as the operator of a grid-scale battery—can use Reinforcement Learning (RL) to maximize profits by intelligently buying, selling, or doing nothing. The RL agent observes key data points of the current electricity prices and price forecasts. Based on these inputs, it decides whether to buy energy, sell energy or hold its position. The agent's goal is to maximize its cumulative profit, calculated as revenue from sales minus the cost of purchases. Real-world applications, like Tesla's Autobidder platform, already use similar RL-driven approaches to outperform traditional rule-based trading systems, often boosting revenues by 10–20%.

Could you provide a simple Python implementation of a Reinforcement Learning (RL) algorithm for real-time electricity trading? You may use any RL technique (e.g., Q-Learning, DQN, PPO) to demonstrate how an agent can optimize buying/selling decisions in a dynamic electricity market.