

## Reinforcement Learning Quiz

**Instructions:** Answer all questions as directed. For True/False questions, select i) or ii). For multiple choice questions, select the best answer(s). Provide brief explanations for your answers where requested.

**Question 1)** Which algorithms belong to the policy-gradient family?

- A) Proximal Policy Optimization (PPO)
- B) Q-learning
- C) REINFORCE
- D) Deep Q-Network (DQN)

**Question 2)** An environment is considered partially observable when:

- A) The agent can observe the full state
- B) Observations lack some hidden variables
- C) The reward signal is stochastic
- D) Transition dynamics are deterministic

**Question 3)** In Q-learning, the key difference from SARSA is:

- A) On-policy vs. off-policy nature
- B) Use of neural networks
- C) Continuous action space support
- D) Model-based planning

**Question 4)** The Advantage term in Actor-Critic methods is calculated as:

- A) State-value minus action-value
- B) Action-value minus state-value
- C) Reward minus entropy
- D) Policy-gradient estimate

**Question 5)** Techniques to stabilize deep-RL training include:

- A) Experience replay
- B) Target networks
- C) Layer normalization
- D) Early stopping

**Question 6)** A discount factor  $\gamma$  close to 0 emphasizes:

- A) Immediate rewards
- B) Long-term rewards
- C) Exploration
- D) Deterministic policies

**Question 7)** The exploration–exploitation dilemma refers to:

- A) Balancing policy and value networks
- B) Choosing between trying new actions and using known good actions
- C) Data augmentation
- D) Hyper-parameter tuning