Assignment #5. QIT. Part 1.

1. In your own words, describe the essential differences between a qubit and a classical bit.

2. Why does the literal interpretation of superpositions entail that a qubit encodes an arbitrarily large amount of information, of which only 1 classical bit's worth is accessible?

3. In your own words, explain *precisely* what is meant by the claim that *unknown* qubits cannot be cloned. Why is the claim restricted to *unknown* qubits?

4. In the protocol for distribuing a secret key using non-orthogonal states of quantum systems, what is the random element associated with Alice's encoding procedure? What is the random element associated with Bob's decoding procedure? Why is this random element important?