

EduFlow Study Notes

Generated: 2025-10-25

```
[
  {
    "front": "What fundamental principles does quantum computing leverage?",
    "back": "Quantum computing leverages the principles of quantum mechanics."
  },
  {
    "front": "How do the basic units of information differ between classical and quantum computers?",
    "back": "Classical computers use bits (0 or 1), while quantum computers use quantum bits or qubits."
  },
  {
    "front": "Define a qubit and explain its primary characteristic that distinguishes it from a classical bit.",
    "back": "A qubit is a quantum bit that can exist in superposition, meaning it can represent multiple states simultaneously, unlike a classical bit which is strictly 0 or 1."
  },
  {
    "front": "Explain the concept of superposition in quantum computing.",
    "back": "Superposition is a principle where a qubit can exist in multiple states (e.g., 0 and 1) at the same time, rather than being limited to a single state."
  },
  {
    "front": "How does superposition enable quantum computers to process information differently from classical computers?",
    "back": "Superposition allows qubits to represent multiple states simultaneously, enabling quantum computers to process vast amounts of information in parallel."
  },
  {
    "front": "Describe entanglement in the context of quantum computing.",
    "back": "Entanglement is a phenomenon where qubits become correlated in ways that have no classical equivalent, meaning the state of one qubit instantly influences the state of another, regardless of distance."
  }
]
```

```

},
{
    "front": "What is the primary advantage offered by the ability of qubits to exist in
superposition?",
    "back": "The ability of qubits to exist in superposition allows quantum computers to
process vast amounts of information in parallel."
},
{
    "front": "Name two key quantum mechanical concepts that are fundamental to quantum
computing.",
    "back": "The two key concepts are superposition and entanglement."
},
{
    "front": "In what way is the correlation between entangled qubits unique compared to
classical correlations?",
    "back": "Entangled qubits are correlated in ways that have no classical equivalent,
implying a deeper, non-local connection."
},
{
    "front": "List four potential application areas for quantum computing mentioned in the
text.",
    "back": "Potential applications include cryptography, drug discovery, financial modeling,
and optimization problems."
},
{
    "front": "Why is quantum computing considered a 'revolutionary approach to
computation'?",
    "back": "It's revolutionary because it leverages the principles of quantum mechanics,
enabling fundamentally different ways of processing information compared to classical
computers."
},
{
    "front": "What are the possible states of a classical bit?",
    "back": "A classical bit can exist in one of two states: 0 or 1."
},
{
    "front": "Which quantum principle directly contributes to a quantum computer's ability to

```

handle 'vast amounts of information in parallel'?",

"back": "Superposition directly contributes to a quantum computer's ability to handle vast amounts of information in parallel."

},

{

"front": "How does the processing capability of a quantum computer, based on its fundamental units, compare to a classical computer?",

"back": "Quantum computers, using qubits in superposition, can process vast amounts of information in parallel, a capability not possible with classical bits."

},

{

"front": "What does it mean for qubits to be 'correlated in ways that have no classical equivalent'?",

"back": "It refers to entanglement, where the states of entangled qubits are interdependent in a manner that cannot be explained by classical physics."

}

]