**1. Understand React and Its Advantages (5 Marks)**

**a) Write a brief explanation of React’s core features: component-based architecture, Virtual DOM, and unidirectional data flow.**

* **Component-Based Architecture:**
  + React encourages breaking down the UI into reusable, independent pieces called components.
  + Each component encapsulates its own logic and rendering, making it easier to manage and maintain complex UIs.
* **Virtual DOM:**
  + React maintains a lightweight copy of the actual DOM in memory, known as the Virtual DOM.
* **Unidirectional Data Flow:**
  + React's unidirectional data flow, where data moves from parent to child components via props, creates a predictable and easily debuggable application by clearly defining how changes propagate.

**b) Discuss why these features make React ideal for building modern web applications.**

* **Component-Based Architecture:**
  + **Reusability**: Components can be reused throughout the application, saving development time and effort.
  + **Maintainability:** Breaking down the UI into smaller, manageable components makes it easier to update and maintain the codebase.
  + **Collaboration**: Teams can work on different components simultaneously, improving development efficiency.
* **Virtual DOM:**
  + **Performance:** The Virtual DOM significantly improves performance by minimizing direct DOM manipulations, which are often expensive.
  + **Responsiveness:** Faster updates result in a more responsive and fluid user experience.
* **Unidirectional Data Flow:**
  + **Predictability:** The single direction of data flow makes it easier to track changes and debug issues.
  + **Easier Debugging:** When data changes, it is very easy to see where the change came from.