# React Fundamentals II Quiz

ChatGPT: https://chatgpt.com/c/68240169-db1c-8009-bc5c-9ffc0a851812

Here's a comprehensive 40-question exam based on the article "Learn React – A Guide to the Key Concepts" from freeCodeCamp:
🔗 https://www.freecodecamp.org/news/learn-react-key-concepts/

📘 **React Key Concepts Exam**

🧠 **SECTION A: Multiple Choice (10 Questions)**

1. What is the purpose of React?
    - A) Server-side rendering
    - B) Managing backend databases
    - C) Building user interfaces
    - D) Writing stylesheets
2. Which of the following best describes a React component?
    - A) A CSS class
    - B) A JavaScript function that returns JSX
    - C) A backend API
    - D) An HTML template
3. Which syntax is used to define JSX?
    - A) HTML
    - B) CSS
    - C) XML-like JavaScript
    - D) JSON
4. What is required when returning multiple elements from a component?
    - A) Using a class
    - B) Wrapping them in a parent element or fragment
    - C) Adding a semicolon

- D) Using setTimeout

5. What hook allows you to store local state in a function component?
    - A) useReducer
    - B) useEffect
    - C) useState
    - D) useMemo
6. React's virtual DOM improves performance by:
    - A) Writing faster CSS
    - B) Directly manipulating the DOM
    - C) Minimizing DOM updates
    - D) Rendering the entire page every time
7. What happens when you call setState?
    - A) A page refresh
    - B) DOM is cleared
    - C) The component is re-rendered
    - D) Component is deleted
8. Keys in React lists are important because:
    - A) They act as passwords
    - B) They help React identify elements that changed
    - C) They are required by browsers
    - D) They make JSX readable
9. Which hook is best for performing side effects?
    - A) useRef
    - B) useMemo
    - C) useEffect
    - D) useCallback

10. What is the difference between props and state?

- A) props are mutable; state is not
- B) state is passed to children; props are internal
- C) props are passed from parent; state is internal
- D) There is no difference

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✔️ **SECTION B: True/False (5 Questions)**

11. JSX is valid JavaScript.
12. You must use class components to manage state in React.
13. React components must begin with a capital letter.
14. The useEffect hook runs only once by default.
15. You can return multiple elements in a React component without a parent wrapper.

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🔍 **SECTION C: Short Answer (10 Questions)**

16. What is JSX and why is it useful in React?
17. Describe the concept of "lifting state up" in React.
18. Why should you avoid modifying state directly?
19. When would you use useEffect with an empty dependency array?
20. What are fragments and why might you use them?
21. How can props be used to make components reusable?
22. Why is immutability important in React state?
23. What does the key prop do in a .map() list rendering?
24. Explain the concept of "one-way data flow" in React.
25. When using useState, what does the setter function actually do?

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📜 **SECTION D: Code Analysis (5 Questions)**

26. **What does the following code render?**

jsx

CopyEdit

```
function Hello() {
  return <h1>Hello World</h1>;
}
```

27. **What will be the output and explanation?**

jsx

CopyEdit

```
function Counter() {
  const [count, setCount] = useState(0);
  return (
    <div>
      <p>{count}</p>
      <button onClick={() => setCount(count + 1)}>Increment</button>
    </div>
  );
}
```

28. **Find and correct the error:**

jsx

CopyEdit

```
function App() {
  const [name, setName] = useState;
  return <p>{name}</p>;
}
```

29. **What will useEffect(() => console.log('Hi')) do in this code?**

jsx

CopyEdit

```
function Greeting() {
  useEffect(() => console.log('Hi'));
  return <p>Welcome</p>;
}
```

30. **What is wrong with this code and how can you fix it?**

jsx

CopyEdit

```
function List() {
  const items = ['A', 'B', 'C'];
  return items.map((item) => <li>{item}</li>);
}
```

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🧠 **SECTION E: Critical Thinking / Extended Response (5 Questions)**

31. Compare and contrast **class components** vs **function components** in React.
32. Describe a scenario where you would **lift state up** and explain why it's necessary.
33. Why is useEffect sometimes referred to as the replacement for lifecycle methods like componentDidMount?
34. Discuss a situation where using **memoization** (useMemo, useCallback) is beneficial.
35. In a component where you fetch data from an API, describe how you'd prevent memory leaks or race conditions using useEffect.

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🖍️ **SECTION F: Drawing/Sketch (2 Questions)**

36. **Draw a React component tree** for the following layout:
    A Dashboard contains a Sidebar and MainContent. MainContent has two children: Header and Content.
37. **Draw a flow diagram** showing how props flow from a parent to multiple children and how a child might lift a value up via an event handler.

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### 🧪 SECTION G: Fill-in-the-Blank (3 Questions)

38. React uses a _____ DOM to improve performance by minimizing actual DOM changes.
39. The useEffect hook takes two arguments: a _____ function and an optional _____ array.
40. The core principle of React data management is called _____ data flow.

**Answer Key – React Key Concepts Exam**

**Section A: Multiple Choice**

1. **C** – To build user interfaces efficiently using components
2. **B** – A reusable piece of UI logic and structure
3. **C** – An HTML-like syntax used within JavaScript
4. **B** – Wrap them in a parent element or use fragments
5. **C** – useState
6. **C** – Minimizing direct DOM manipulation by updating only what changed
7. **C** – It schedules a re-render with the new state
8. **B** – They help React identify which items have changed
9. **C** – useEffect
10. **C** – Props are read-only; state is managed locally

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**Section B: True/False**

11. **True**
12. **False**
13. **True**
14. **False**
15. **False**

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**Section C: Short Answer**

16. **JSX is a syntax extension for JavaScript that looks like HTML and is used with React to describe the UI.**
17. **Lifting state up means moving state to a common ancestor to share it among multiple components.**
18. **Because direct mutation doesn't trigger re-renders; always use the setter function.**

19. **When you want the effect to run only once after the first render.**
20. **Fragments let you group elements without adding extra nodes to the DOM.**
21. **Props allow data to be passed into components, making them customizable and reusable.**
22. **It ensures changes are predictable and traceable, which is important for performance.**
23. **Helps React identify which items changed, are added, or are removed.**
24. **Data flows from parent to child components only, not the other way around.**
25. **It schedules an update to the component's state and causes a re-render.**

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**Section D: Code Analysis**

26. **<h1>Hello World</h1> will render.**
27. **A paragraph with count and a button that increments it.**
28. **Missing parentheses in useState; should be useState('') or similar.**
29. **It will log "Hi" on every render because no dependency array was provided.**
30. **Missing key prop; should use <li key={item}>.**

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**Section E: Critical Thinking / Extended Response**

31. **Function components are simpler and use hooks; class components use lifecycle methods.**
32. **When two child components need access to shared state, it is lifted to the parent.**
33. **Because useEffect mimics lifecycle methods like componentDidMount.**
34. **To avoid recalculating values or functions unless dependencies change.**
35. **Use cleanup function inside useEffect or AbortController to cancel async ops.**

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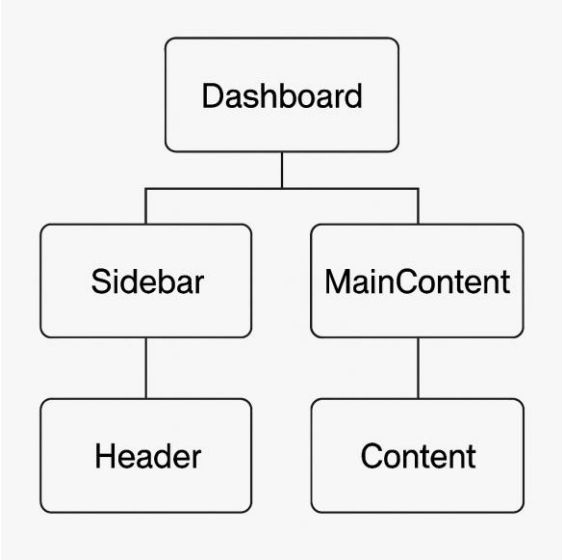
**Section F: Drawing/Sketch**

36. **Student drawing: Component tree (e.g., Dashboard → Sidebar, MainContent → Header and Content)**




37. **Student drawing: One-way data flow of props; upward arrows for event callbacks**

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**Section G: Fill-in-the-Blank**

38. **virtual**
39. **callback, dependency**
40. **one-way**