Here are **very long, clear, exam-oriented answers** for **all 10 questions** related to **React Router, npm, Git**, written in **LPU / MCA / Web Technologies** style. You can directly use these for **10–15 mark answers**.

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1. How do we render the route? Explain its types.

In React, **routes are rendered using React Router**, which maps a URL path to a specific component. When the URL matches a defined route, the corresponding component is rendered.

Routes are rendered inside a <Router> component using <Route>.

Basic route rendering:

<Route path="/home" element={<Home />} />

Types of Routing:

(a) Static Routing

Routes are defined at compile time.

Example:

<Route path="/about" element={<About />} />

(b) Dynamic Routing

Routes are generated dynamically based on data or parameters.

Example:

<Route path="/user/:id" element={<User />} />

(c) Nested Routing

Routes inside another route.

Example:

<Route path="/dashboard" element={<Dashboard />}>

  <Route path="profile" element={<Profile />} />

</Route>

(d) Conditional Routing

Routes rendered based on conditions like authentication.

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2. Explain npm in React.

npm (Node Package Manager) is a tool used to **manage JavaScript packages and dependencies** in React applications.

Uses of npm in React:

- Install React and related libraries

- Manage project dependencies
- Run scripts
- Update packages

Common npm commands:

npm install

npm start

npm run build

npm install react-router-dom

Explanation:

- package.json stores dependencies
- node_modules contains installed packages
- npm ensures version control and dependency management

npm plays a crucial role in React development.

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3. How can we install React? Explain its steps.

React is commonly installed using **Create React App (CRA)**.

Steps to install React:

Step 1: Install Node.js

Download and install Node.js (includes npm).

Step 2: Create React App

npx create-react-app my-app

Step 3: Navigate to project folder

cd my-app

Step 4: Start development server

npm start

Explanation:

- npx runs packages without installing globally
- CRA sets up Webpack, Babel, and folder structure
- Browser opens at http://localhost:3000

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4. How do we implement Router in React?

React Router is implemented using **react-router-dom**.

Steps:

Step 1: Install React Router

npm install react-router-dom

Step 2: Import Router components

import { BrowserRouter, Routes, Route } from "react-router-dom";

Step 3: Define routes

```
<BrowserRouter>
  <Routes>
    <Route path="/" element={<Home />} />
    <Route path="/about" element={<About />} />
  </Routes>
</BrowserRouter>
```

Explanation:

- BrowserRouter manages URL
- Routes contains all routes
- Route maps path to component

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5. What is .gitignore?

.gitignore is a file used in **Git** to specify which files or folders should **not be tracked** by version control.

Purpose:

- Avoid uploading unnecessary files
- Protect sensitive data
- Reduce repository size

Common entries in React .gitignore:

```
node_modules/
.env
build/
```

Explanation:

Files listed in .gitignore are ignored by Git during commits.

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6. What are Router Parameters?

Router parameters are dynamic values passed through URLs.

Example:

<Route path="/user/:id" element={<User />} />

Accessing parameters:

import { useParams } from "react-router-dom";

const User = () => {

  const { id } = useParams();

};

Use cases:

- User profiles
- Product details
- Dynamic pages

Router parameters make routing flexible and dynamic.

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7. What is react-router-dom? Explain.

react-router-dom is a **routing library** for React web applications.

Features:

- Client-side routing
- Page navigation without reload
- Dynamic routing
- Nested routes
- Route parameters

Key components:

- BrowserRouter
- Routes
- Route
- Link
- NavLink
- useParams
- useNavigate

Example:

<Link to="/home">Home</Link>

It helps build **single-page applications (SPA)**.

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8. What happens when you need to navigate TWO routing systems?

When two routing systems are used (e.g., **React Router + another router**), conflicts may occur.

Problems:

- URL conflicts
- Navigation inconsistency
- Performance issues
- Harder debugging

Common cases:

- Micro-frontend architecture
- Mixing server-side routing with client-side routing

Solution:

- Use a single routing system
- Clearly define route ownership
- Use nested routing carefully

React Router is generally sufficient for most applications.

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9. How can we add React Router?

React Router is added by installing react-router-dom.

Steps:

npm install react-router-dom

Then import and use router components:

import { BrowserRouter } from "react-router-dom";

Wrap the main app:

<BrowserRouter>

  <App />

</BrowserRouter>

This enables routing across the application.

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10. Explain the need of React Router.

React Router is needed to create **navigation in single-page applications**.

Why React Router is needed:

- Avoid full page reloads
- Improve performance
- Maintain application state
- Enable bookmarkable URLs
- Create dynamic views

Without React Router:

- Manual DOM manipulation
- Page reloads
- Poor user experience

With React Router:

- Seamless navigation
- Fast rendering
- Clean URL management

React Router is essential for modern React web applications.

If you want:

- **Short 5-mark answers**
- **React Router MCQs**
- **Diagram-based explanation**
- **Complete React Router notes**

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