**CHAPTER 7: TESTING**

Testing is a critical phase in software development that ensures the system functions as expected before deployment. The PDS-Transport System undergoes various testing levels, including unit testing, integration testing, system testing, and user acceptance testing (UAT). This process helps identify and eliminate bugs, improve performance, and enhance user experience.

**7.1 Testing Plan / Strategy:**

**Testing Objectives:**

🔹 Verify the system's core functionalities, including authentication, CRUD operations.  
🔹 Ensure that the UI is responsive and accessible across devices.  
🔹 Validate API performance and security measures.  
🔹 Identify and fix UI/UX inconsistencies.  
🔹 Check the compatibility of the system across browsers and devices.

**Testing Approach:**

|  |  |  |
| --- | --- | --- |
| **Type of Testing** | **Purpose** | **Tools Used** |
| Unit Testing | Verify individual functions and components | React Testing Library |
| Integration Testing | Ensure smooth communication between frontend and backend. | Postman, Mocha, |
| System Testing | Validate system functionality. | Cypress, Selenium |
| Performance Testing | Check system load and response time. | JMeter |
| Security Testing | Identify vulnerabilities in authentication and database security. | ZAP, Burp Suite |
| User Acceptance Testing | Ensure real-world usability with client validation. | Manual Testing |

**A screenshot of a computer code

AI-generated content may be incorrect.**

Fig 7.1 Integration Testing

A computer screen with white text

AI-generated content may be incorrect.

Fig 7.2 Unit Testing

**7.2 testing Results and Analysis:**

The testing phase identified **several issues** in the initial development stage, which were resolved before final deployment. Below is a summary of the test results and their impact on system performance.

**Key Findings from Testing:**

✅ **Authentication & Authorization:** JWT authentication passed security tests with no vulnerabilities found.  
✅ **Data Validation:** Proper input validation prevents incorrect data entry.  
✅ **API Performance:** API calls were optimized, reducing response times.  
✅ **UI/UX Issues:** Several UI inconsistencies were fixed based on user feedback.  
✅ **Load Testing:** The system handles 1,000+ concurrent users efficiently.  
✅ **Cross-Browser Compatibility:** Works smoothly on Chrome, Firefox, Edge, and Safari.