**Functional Requirements:**

A. *Authentication & Authorization*

1. Login/Signup

- Users must authenticate with email and password.

- New users can create accounts with an email and password.

2. Session Management

- Users remain logged in until they explicitly log out.

- Session timeout after 30 minutes of inactivity.

B. *Dashboard*

1. Key Metrics Display

- Real-time overview of:

- Active purchase orders

- Inventory health (stock levels)

- Production efficiency

- Open quality defects

- Shipment statuses (Scheduled/In Transit/Delivered)

C. *Inventory Management*

1. Raw Material Tracking

- Add/edit/delete inventory items (material, quantity, type).

- Automatic stock alerts when levels fall below thresholds.

2. Warehouse Management

- Track items across multiple warehouse locations.

- Generate inventory reports (CSV/PDF).

D. *Production Management*

1. Scheduling

- Create production schedules with start dates and quantities.

- Assign workflows to specific production lines.

2. Monitoring

- Track progress of active production orders.

- Identify bottlenecks in real time.

E. *Quality Control*

1. Inspections

- Record inspection results (Passed/Failed).

- Assign corrective actions (Repaint, Solve, Recheck, No Action).

2. Defect Tracking

- Log defects with batch IDs and root causes.

- Update defect resolution status (Open/Resolved).

F. *Logistics & Distribution*

1. Shipment Management

- Schedule deliveries with destinations (8 Bangladeshi divisions).

- Track shipments in real time (Scheduled → In Transit → Delivered).

2. Carrier Coordination

- Assign shipments to internal/external carriers.

- Generate shipping labels and documentation.

G. *Reporting*

1. Custom Reports

- Generate reports for:

- Inventory usage

- Production efficiency

- Supplier performance

- Quality trends

2. Data Export

- Export reports in PDF/CSV formats.

**Non-Functional Requirements:**

A. *Performance*

1. Response time ≤ 2 seconds for 95% of requests.

2. Support 100+ concurrent users.

B. *Security*

1. Role-based access control (RBAC).

2. Data encryption (AES-256) for sensitive information.

3. Secure authentication (JWT tokens).

C. *Usability*

1. Responsive design for desktop and mobile.

2. Multi-language support (English/Bengali).

3. Intuitive UI with tooltips and guided workflows.

D. *Reliability*

1. 99.9% uptime during business hours (8 AM – 10 PM).

2. Automated daily backups.

E. *Compatibility*

1. Browser Support: Chrome, Firefox, Safari (latest versions).

2. Mobile Support: Android/iOS (via responsive web interface).

**System Interfaces:**

1. Hardware

- Barcode scanners for inventory tracking.

- Mobile devices for field operations.

2. Software

- Integration with:

- ERP systems (e.g., SAP)

- Accounting software (e.g., QuickBooks)

- Email/SMS gateways for notifications

**Assumptions & Constraints**:

1. Assumptions

- Stable internet connectivity for real-time updates.

- Users receive training before system adoption.

2. Constraints

- Legacy system compatibility during migration.

- Budget limitations for IoT device integration.

**Future Enhancements:**

1. IoT integration for machine monitoring.

2. Predictive analytics for demand forecasting.

3. Mobile app for field staff.