Project Design Phase
Solution Architecture

Date	20 July 2025
Team ID	PNT2025TMID09656
Project Name	ShopEZ: E-commerce Application
Maximum Marks	4 marks

ShopEZ Solution Architecture

Client Layer (User Interaction)

- **User: Shopper or Seller accessing the platform.**

- **Browser: Medium to interact with the web app.**

- **ShopEZ Frontend: React.js-based interface for browsing, cart, checkout, and seller dashboards.**

Frontend Layer

- **React.js:**

  - **Builds dynamic and responsive UI components.**

  - **Handles state management for cart, products, and orders.**

  - **Makes API calls to the backend via REST APIs.**

Backend Layer

- **Node.js:**

  - **JavaScript runtime environment for server logic.**

  - **Handles business logic (authentication, order processing, product management).**

- **Express.js:**

  - **Manages HTTP requests and routes.**

  - **Connects frontend with the database and external APIs.**

Database Layer

- **MongoDB:**

  - **Stores user profiles, product details, carts, orders, payments, and seller info.**

  - **NoSQL schema for scalability and fast queries.**

External Services

- **Payment Gateway API:**
  - Secure transaction processing (e.g., Razorpay/Stripe).
- **Notification/Email Service:**
  - Sends order confirmations, shipping updates, and promotional emails.
- **Cloud Storage (Optional):**
  - Stores product images and digital assets (e.g., AWS S3).

Interaction Flow

User Access: Shopper opens ShopEZ via browser → React.js UI loads.

API Calls:

- **User actions (browse/add to cart/checkout) → HTTP requests to Node.js backend.**

Backend Operations:

- **Express.js routes request → Business logic executed → MongoDB queried/updated.**

Payment & Notifications:

- **On checkout → Payment Gateway API processes payment → Notification Service sends confirmation.**

Response to Frontend:

- **Backend sends response → React updates UI in real time.**

Solution Architecture of ShopEZ

User

React.js

Frentend

node.js

Express.js

Database

mongoDB

External Services

Payment Gateway API

Notification/ Email Service