**B.Tech(ECE)-QUANTUM UNIVERSITY-1-Task3-** **Imagine you need to develop a product for new startup company**

**Waterfall Development Model Phases:**

**1. Requirement Gathering & Analysis**

i) Identify key features & user needs  
ii) Conduct market research on existing devices  
iii) Gather requirements from athletes, medical professionals & general users  
iv) Define compliance with healthcare regulations (FDA, CE)

**Deliverables:**

* Functional & non-functional requirements
* Market research report
* Regulatory requirements document

**2. System Design**

i) Create technical architecture for hardware & software integration  
ii) Define sensor selection for accurate heart rate tracking  
iii) Develop UI/UX wireframes for mobile app connectivity  
iv) Design battery optimization & real-time data transmission features

**Deliverables:**

* Hardware & software architecture diagram
* UX wireframes & app prototype
* Database schema for user health records

**3. Implementation (Development Phase)**

i) Build the hardware prototype with sensors & microcontroller  
ii) Develop firmware for data collection & Bluetooth connectivity  
iii) Create a mobile app for real-time heart rate tracking & analytics  
iv) Integrate AI for irregular heartbeat detection

**Deliverables:**

* Hardware prototype
* Mobile app (Android/iOS)
* Cloud integration for data storage

**4. Testing Phase**

i) Unit testing for individual components (sensors, battery, Bluetooth)  
ii) Integration testing for app-device connectivity  
iii) User acceptance testing (UAT) with healthcare professionals  
iv) Stress testing for real-time heart rate monitoring

**Deliverables:**

* Test case reports
* Bug tracking & fixes
* Compliance testing results

**5. Deployment**

i) Manufacture & assemble devices at scale  
ii) Distribute devices to hospitals, gyms & retail stores  
iii) Launch on App Store & Google Play  
iv) Create user manuals & customer support guides

**Deliverables:**

* Final production-ready device
* Mobile app release
* Marketing & launch plan

**6. Maintenance & Support**

i) Regular software updates for bug fixes & feature enhancements  
ii) Improve AI models for more accurate heart rate detection  
iii) Provide customer support for troubleshooting  
iv) Gather user feedback for future improvements

**Deliverables:**

* Performance monitoring reports
* Customer feedback & review analytics
* Iterative product improvement roadmap

**Why Waterfall Model for This Product?**

i) Ideal for **hardware-based products** where clear documentation is needed  
 ii) Ensures **regulatory compliance** before moving to the next phase  
iii) Reduces risk with **structured & sequential** development  
iv) Guarantees **stable & reliable** final product for healthcare users

