

## **Waterfall Model – Copestone Project**

**Question 1** – BPM -"Identify Business Process Model for Online Agriculture Store – (Goal, Inputs, Resources, Outputs, Activities, Value created to the end Customer).

**Answer:** Business Process Model (BPM) – Online Agriculture Store

- Goal – To bridge the gap between farmers and agriculture product manufacturers by providing an easy-to-use online platform.
- Inputs – Farmers' requirements, manufacturers' product details (fertilizers, seeds, pesticides), customer data, CSR budget, internet connectivity.
- Resources – Skilled IT team (developers, testers, BA), software platform (web & mobile app), database, servers/cloud, logistics partners, office space.
- Outputs – Successful online orders, timely delivery of products, digital transaction records, increased farmer accessibility to Agri-products.
- Activities – Product listing by manufacturers, farmers browsing and ordering, order confirmation & payment, logistics & delivery, customer support, feedback collection.
- Value created to the end Customer – Convenience for farmers, cost & time savings, improved access to essential products, enhanced farming productivity, overall customer satisfaction.

**Question 2** – SWOT-"Mr Karthik is doing SWOT analysis before he accepts this project. What Aspects he Should consider as Strengths, as Weaknesses, as Opportunity and as Threats.

**Answer:** SWOT Analysis – Online Agriculture Store

- Strengths – Skilled IT team, clear budget allocation, strong leadership support, CSR-driven project, positive social impact.
- Weaknesses – Low digital literacy among farmers, dependency on internet in remote areas, training needs, risk of scope changes, long project duration.
- Opportunities – Growing Agri-tech and e-commerce market, scope to expand product range (equipment, advisory, loans), potential partnerships with logistics & payment gateways, scalability to wider regions, brand reputation through CSR.
- Threats – Competition from existing Agri-platforms, regulatory/compliance issues, trust concerns with online transactions, resistance from farmers to adopt technology, risks of fraud or system downtime.

|                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Strengths</b></p> <p>Skilled IT team, clear budget allocation, strong leadership support, CSR-driven project, positive social impact.</p>                                                                                                                   | <p style="text-align: center;"><b>Weaknesses</b></p> <p>Low digital literacy among farmers, dependency on internet in remote areas, training needs, risk of scope changes, long project duration.</p>                                                     |
| <p style="text-align: center;"><b>Opportunities</b></p> <p>Growing Agri-tech and e-commerce market, scope to expand product range (equipment, advisory, loans), potential partnerships with logistics &amp; payment gateways, scalability to wider regions, brand reputation through CSR.</p> | <p style="text-align: center;"><b>Threats</b></p> <p>Competition from existing Agri-platforms, regulatory/compliance issues, trust concerns with online transactions, resistance from farmers to adopt technology, risks of fraud or system downtime.</p> |

**Question 3** – Feasibility study - Mr Karthik is trying to do feasibility study on doing this project in Technology (Java), Please help him with points (HW SW Trained Resources Budget Time frame) to consider in feasibility Study.

**Answer:** Feasibility Study: Based on Java (Technology)

#### 1. Technology

- Based on Java technology for backend development with database (SQL Server) for managing products, orders, and users.
- Requires secure APIs for payment gateways, authentication, and data exchange.

#### 2. Hardware

- Database Storage (SQL Server): To store and manage all product, farmer, and company data.
- Backup Systems: For data protection and recovery in case of hardware failure or cyberattacks.

- Network Infrastructure: High-speed internet and servers to support continuous availability and smooth connectivity.

### 3. Software

- Shopping Cart Software: Enables farmers to select, add, and order agricultural products.
- Content Management System (CMS): For product listings, descriptions, and updates by manufacturers.
- Payment Gateway Software: Secure system for handling online transactions like (PayPal, Phonepe, Net banking, Debit/Credit cards etc)

### 4. Trained Resources

- Project Management Team: To oversee execution, planning, timelines, and delivery.
- Business Analyst: To gather requirements and align them with business objectives.
- Software Developers: To design, build, to ensure quality, functionality, security and integrate the application with backend and APIs. To manage infrastructure and database operations.

### 5. Budget

- Development Costs: Salaries for IT team, testing, deployment, and ongoing maintenance.
- Software Costs: Licenses for CMS, backup, payment gateway integration, and supporting tools.
- Infrastructure Costs: Server hosting, storage, and networking setup.

### 6. Time Frame

- Timeline depends on available resources and scope of features.
- With proper planning, project can be completed in 18 months, including design, development, testing, and deployment.

**Question 4** – Gap Analysis - Mr Karthik must submit Gap Analysis to Mr Henry to convince to initiate this project. What points (compare AS-IS existing process with TO-BE future Process) to showcase in the GAP Analysis

**Answer:** For Gap Analysis, the following Points are comparing the AS-IS (Current State) vs TO-BE (Desired State).

Current State (AS-IS) - Farmers in remote areas struggle to access quality seeds, fertilizers, and pesticides. They depend on middlemen, face higher costs, and lack direct

communication with manufacturers. Purchases are mostly cash-based without proper records, and farmers often travel long distances to buy products. There is also no structured customer support or centralized record-keeping for planning.

Desired State (TO-BE) - The Online Agriculture Products Store will provide farmers with direct access to manufacturers, ensuring fair prices and transparent options. The platform will enable real-time communication, secure online payments, and doorstep delivery through logistics partners. Farmers will also benefit from dedicated customer support and digital records, helping them make better decisions and plan.

**Question 5 – Risk Analysis** - List down different risk factors that may be involved (BA Risks And process/Project Risks)

**Answer:** The following different risk factors may be involved in the Online Agriculture Products Store project are:

#### 1. BA Risks

- Incomplete or unclear requirements from farmers and companies.
- Stakeholders and developers may misunderstand each other.
- In Waterfall, requirements are finalized at the start, so changes later can be costly.

#### 2. External Risks

- Poor internet in Remote villages may affect farmers using the app.
- Government policies or rules in agriculture may change.
- Other e-commerce platforms may compete.
- Some farmers may not be comfortable with technology.

#### 3. Internal Risks

- Technical problems with the Java technology, Database or Payment system.
- Team members may not be fully trained to handle the system.

#### 4. Project Risks

- The project might take more time and cost more than expected.
- Shortage of skilled people or team members.
- Risk of delays if many bugs are found late.
- Security issues like payment failures or data leaks may arise during testing.

**Question 6 – Stakeholder Analysis (RACI Matrix) -Perform stakeholder analysis (RACI Matrix)**  
to find out the key stakeholders who can take Decisions and Who are the influencers

**Answer:** Key Stakeholders & their Roles

| RACI        | Name of Resources                                     | Designation           | Details                                                                                                                                                     |
|-------------|-------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Responsible | Ms. Sweety                                            | Business Analyst      | sweety@APTITSOLUTIONS.com<br>Phone No.-111-111-1105<br>Reach out-10AM to 4PM                                                                                |
|             | Ms. Juhi                                              | Senior Java Developer | juhi@APTITSOLUTIONS.com<br>Phone No.-111-111-1118<br>Reach out-10AM to 4PM                                                                                  |
|             | Mr. Teyson,<br>Ms. Lucie,<br>Mr. Tucker,<br>Mr. Bravo | Java Developers       | teyson@APTITSOLUTIONS.com,lucie@APTITSOLUTIONS.com<br>tucker@APTITSOLUTIONS.com,bravo@APTITSOLUTIONS.com<br>Phone No.-111-111-1116<br>Reach out-10AM to 4PM |
|             | Mr. Mike                                              | Network Admin         | mike@APTITSOLUTIONS.com<br>Phone No.-111-111-1114<br>Reach out-10AM to 4PM                                                                                  |
|             | John                                                  | DB Admin              | john@APTITSOLUTIONS.com<br>Phone No.-111-111-1115<br>Reach out-10AM to 4PM                                                                                  |
|             | Mr. Jason,<br>Ms. Alekya                              | Testers               | jason@APTITSOLUTIONS.com,<br>alekya@APTITSOLUTIONS.com<br>Phone No.-111-111-1110<br>Reach out-10AM to 4PM                                                   |
| Accountable | Mr. Henry                                             | Project Sponsor       | henry@APTITSOLUTIONS.com<br>Phone No.-111-112-1111<br>Reach out-10AM to 4PM                                                                                 |
|             | Mr. Pandu                                             | Financial Head        | pandu@APTITSOLUTIONS.com<br>Phone No.-111-114-1111<br>Reach out-10AM to 4PM                                                                                 |
|             | Mr. Dooku                                             | Project Coordinator   | dooku@APTITSOLUTIONS.com<br>Phone No.-111-115-1111<br>Reach out-10AM to 4PM                                                                                 |
|             | Mr. Karthik                                           | Delivery Head         | karthik@APTITSOLUTIONS.com<br>Phone No.-112-111-1111<br>Reach out-10AM to 4PM                                                                               |
|             | Mr. Vandanam                                          | Project Manager       | vandanam@APTITSOLUTIONS.com<br>Phone No.-114-111-1111<br>Reach out-10AM to 4PM                                                                              |
|             | Peter                                                 | Stakeholder           | peter@123.com<br>Phone No.-103-111-1111<br>Reach out-10AM to 4PM                                                                                            |

|           |              |                     |                                                                                |
|-----------|--------------|---------------------|--------------------------------------------------------------------------------|
| Consulted | Kevin        | Stakeholder         | kevin@123.com<br>Phone No.-101-111-1111<br>Reach out-10AM to 4PM               |
|           | Ben          | Stakeholder         | ben@123.com<br>Phone No.-102-111-1111<br>Reach out-10AM to 4PM                 |
|           | Mr. Karthik  | Delivery Head       | karthik@APTITSOLUTIONS.com<br>Phone No.-112-111-1111<br>Reach out-10AM to 4PM  |
|           | Mr. Vandanam | Project Manager     | vandanam@APTITSOLUTIONS.com<br>Phone No.-114-111-1111<br>Reach out-10AM to 4PM |
| Informed  | Mr. Henry    | Project Sponsor     | henry@APTITSOLUTIONS.com<br>Phone No.-111-112-1111<br>Reach out-10AM to 4PM    |
|           | Mr. Pandu    | Financial Head      | pandu@APTITSOLUTIONS.com<br>Phone No.-111-114-1111<br>Reach out-10AM to 4PM    |
|           | Mr. Dooku    | Project Coordinator | dooku@APTITSOLUTIONS.com<br>Phone No.-111-115-1111<br>Reach out-10AM to 4PM    |
|           | Peter        | Stakeholder         | peter@123.com<br>Phone No.-103-111-1111<br>Reach out-10AM to 4PM               |
|           | Kevin        | Stakeholder         | kevin@123.com<br>Phone No.-101-111-1111<br>Reach out-10AM to 4PM               |
|           | Ben          | Stakeholder         | ben@123.com<br>Phone No.-102-111-1111<br>Reach out-10AM to 4PM                 |

**Question 7** – Business Case Document - Help Mr Karthik to prepare a business case document?

**Answer:** Business Case Document

| <u>Question</u>                   | <u>Answer</u>                                                                                                                                                                          |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Why is this project initiated? | This project is initiated under SOONY's CSR initiative with a budget of 2 Crores and 18 months' timeline to build an IT solution that improves efficiency and meets stakeholder needs. |
| 2. What are the current problems? | Manual processes causing delays, poor reporting, and Miscommunication between stakeholders and delivery team.                                                                          |

|                                                          |                                                                                                                                                                                                      |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. With this project, how many problems could be solved? | Automates tasks, improves reporting, ensures requirement clarity, and builds better collaboration.                                                                                                   |
| 4. What are the resources required?                      | Human Resources: Sponsor, PM, BA, Dev, Testers, Finance head, Delivery Head.<br>Technology: Java, Database, Testing tools, Network infrastructure.<br>Finance: Project Budget of 2 Crores INR.       |
| 5. How much organizational change is required?           | Moderate – user training, workflow changes, and management support needed.                                                                                                                           |
| 6. Time frame to recover ROI?                            | ROI expected in 2–3 years through cost savings and efficiency gains.                                                                                                                                 |
| 7. How to identify stakeholders?                         | Primary: Henry, Pandu, Dooku.<br>Secondary - They provide requirements (Peter, Kevin, Ben)<br>Delivery team: PM, BA, Dev, Testers, DB.<br>Influencers: CSR Committee, Financial Head, Delivery Head. |

**Question 8** – Four SDLC Methodologies -"The Committee of Mr. Henry, Mr Pandu, and Mr Dooku and Mr Karthik are having a discussion on Project Development Approach. Mr Karthik explained to Mr. Henry about SDLC. And four methodologies like Sequential Iterative Evolutionary and Agile. Please share your thoughts and clarity on Methodologies"

**Answer:** The four SDLC Methodologies that Mr. Karthik can share with the committee are as follows:

Sequential: In this methodology, Work is done in phases: Requirement → Design → Development → Testing → Deployment. This is best for projects with well-defined, fixed requirements. It is hard to make changes once started.

Iterative: Project is built in small cycles (iterations), each cycle gives a working version. It is best for project when requirements are partial known. It Needs more planning and regular feedback.

Evolutionary: The system is developed in stages, with prototypes built and refined based on user feedback and each version evolves until the final system is ready. This is best for unclear or changing requirements. This methodology Can take more time and resources.

Agile: In this methodology, Work is done in short sprints (1–4 weeks) with continuous delivery. It is best for dynamic projects with frequent requirement changes. This methodology needs strong teamwork and active stakeholder involvement.

**Question 9** – Waterfall RUP Spiral and Scrum Models –They discussed models in SDLC like waterfall RUP Spiral and Scrum. You put forth your understanding on these models. When the APT IT SOLUTIONS company got the project to make this online agriculture product store, there is a difference of opinion between a couple of SMEs and the project team regarding which methodology would be more suitable for this project. SMEs are stressing on using the V model and the project team is leaning more onto the side of waterfall model. As a business analyst, which methodology do you think would be better for this project?

**Answer:**

Waterfall: Waterfall is a linear, sequential model where each phase—requirements, design, development, testing—happens one after the other. It is simple but it is hard to changed once development starts, and in this model, testing happens at the end.

RUP (Rational Unified Process): In this model, it has Iterative and incremental approach. Its Divides work into Inception, Elaboration, Construction, Transition. This model is best for medium to large projects where requirements may evolve. This model is complex and need strong documentation.

Spiral: This model is a combination of iterative development and risk management and Each cycle = planning, risk analysis, development, and evaluation. It is best for risk project and new technologies. This model is expensive and time-consuming.

Scrum (Agile): In this model, Work is done in short sprints (1–4 weeks) with continuous delivery. It is Best for projects with changing requirements and strong stakeholder involvement. This model needs strong teamwork and active stakeholder involvement.

SMEs prefer V-Model- This is Similar to waterfall but focus on testing at each stage (verification and validation). This model is best when requirements are very stable.

Project team prefers waterfall: This model is Simple, structured, and easier for planning.

As a business analyst, I would suggest Agile for better approach because for an online agriculture product store, requirements may change often. It gives flexibility, quick feedback, and allows delivering the product in parts, ensuring stakeholder satisfaction.

**Question 10** – Waterfall Vs V-Model – 20 Write down the differences between waterfall model and V model.

**Answer:** The differences between Waterfall model and V model are as follows:

| <u>Waterfall Model</u>                | <u>V Model</u>                                                                                 |
|---------------------------------------|------------------------------------------------------------------------------------------------|
| Waterfall is linear and step-by-step. | V Model is also a linear but it curves upward—every development step has a matching test step. |



|                                                                                              |                                                                                            |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| It is Straight-line progression: Requirements → Design → Development → Testing → Maintenance | It is V-shaped structure: Left side for development, right side for corresponding testing. |
| Testing happens only at the end.                                                             | Testing happens along with each phase.                                                     |
| It focus on completing each phase.                                                           | It Focus on quality and early defect detection.                                            |
| It is hard to make changes once started.                                                     | Some changes are easier because testing is planned                                         |
| It is difficult to go back to previous phases                                                | It is more flexible and its validation phases allow early defect detection.                |
| It Works best for small or simple projects.                                                  | It Works best for critical, high-quality projects.                                         |
| No parallel activities are done.                                                             | Development and testing run in parallel.                                                   |
| Delivery happens only at the end.                                                            | Delivery also happens at the end but all stages are verified.                              |
| Customer involvement is less.                                                                | Customer involvement is More.                                                              |
| It best for projects with well-defined, stable requirements.                                 | It best for smaller projects with clear validation needs                                   |
| Defects are usually found late.                                                              | Defects are found early during development.                                                |
| Fixing defects is costly.                                                                    | Fixing defects is cheaper because found early.                                             |
| Limited quality checks during development.                                                   | Quality checks happen during each development step.                                        |
| Maintenance happens once the project is finished.                                            | Maintenance is considered during validation planning                                       |

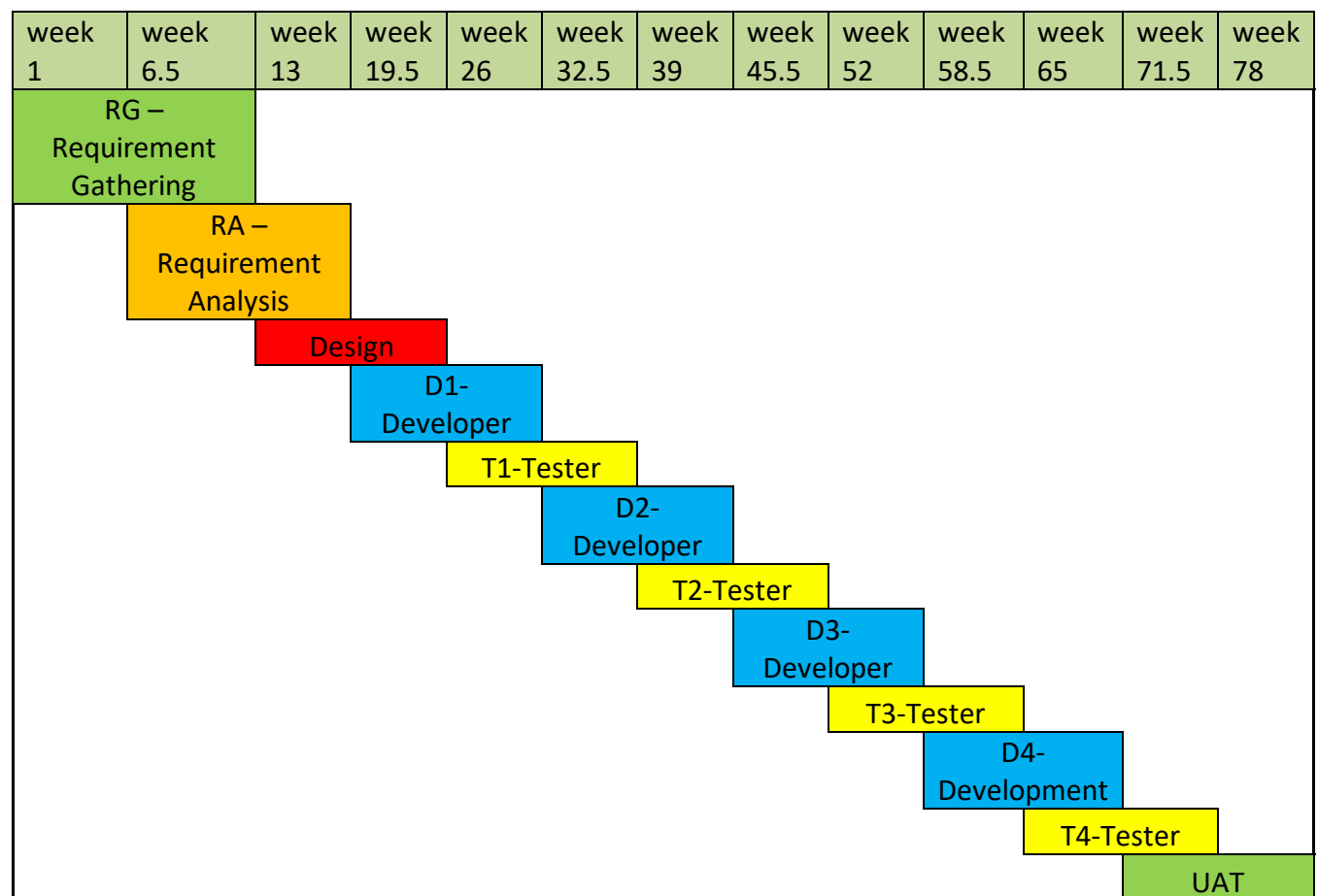
**Question 11** – Justify your choice - As a BA, state your reason for choosing one model for this project?

**Answer:** "According to this case study, as a BA, I would suggest using both the Waterfall model and Agile for this project. The Waterfall model is suitable because the requirements are clear and well-defined, and its step-by-step approach makes planning, designing, development, and testing easier while ensuring proper documentation and a structured workflow. At the same time, Agile can be applied in parts of the project where requirements may change, as it allows flexibility, stakeholder involvement, and faster delivery of features.

Many organizations use a mixture of two models: for high-level planning, budgeting, and approvals they follow Waterfall, while development and testing are done in Agile sprints. Combining both approaches ensures a complete, high-quality system delivered on time, while also adjusting to any changes during the project." Using two models together in one project. This is called a Hybrid Approach.

**Question 12** – Gantt Chart -The Committee of Mr. Henry, Mr Pandu, and Mr Dooku discussed with Mr Karthik and finalised on the V Model approach (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT) Mr Vandanam is mapped as a PM to this project. He studies this Project and Prepares a Gantt chart with V Model (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT) as development process and the Resources are PM, BA, Java Developers, testers, DB Admin, NW Admin.

**Answer:** Gantt Chart



**Question 13** – Fixed Bid Vs Billing - Explain the difference between Fixed Bid and Billing projects

**Answer:** The main difference between Fixed Bid and Billing projects are in how the cost is managed.

Fixed Bid, the price is decided at the start based on the agreed scope and timelines, so it works well when requirements are very clear. But if changes come later, it can cause re-negotiation. So, Fixed Bid is best for stable projects

Billing Projects, the client pays for the actual hours and resources used, which gives more flexibility when requirements are not fully defined or may change during the project.

**Question 14** – Preparer Timesheets of a BA in various stages of SDLC -> Design Timesheet of a BA > Development Timesheet of a BA > Testing Timesheet of a BA > UAT Timesheet of a BA > Deployment n Implementation Timesheet of a BA?

**Answer:** In BA work, start and end times vary depending on the task, because some tasks take longer than others. Each SDLC phase usually involves around 5 to 7.5 hours of active BA work per day, including meetings, documentation, support, and coordination with the team."

| Design Timesheet of a BA      |                            |                                          |            |          |                |
|-------------------------------|----------------------------|------------------------------------------|------------|----------|----------------|
| S. No                         | Tasks                      | Actionable Items                         | Start time | End time | Duration       |
| 1                             | Requirement Review         | Read and understand BRD/SRS              | 9:30 AM    | 11:00 AM | 1.5 hrs        |
| 2                             | Design Discussion          | Meet with solution architects/developers | 11:00 AM   | 12:30 PM | 1.5 hrs        |
| 3                             | Team Meetings              | Daily stand-up                           | 12:30 PM   | 1:00 PM  | 30 mins        |
| 4                             | Update Documents           | Update BRD/SRS/FRD                       | 2:00 PM    | 4:00 PM  | 2 hrs          |
| 5                             | Stakeholder Clarifications | Discuss unclear points with client/SMEs  | 4:00 PM    | 6:00     | 2 hrs          |
| Total Time                    |                            |                                          |            |          | 7.5 hrs        |
| Development Timesheet of a BA |                            |                                          |            |          |                |
| S. No                         | Tasks                      | Actionable Items                         | Start time | End time | Duration       |
| 1                             | Requirement Updates        | Update documents if changes arise        | 9:30 AM    | 10:30 AM | 1 hr           |
| 2                             | Developer Support          | Answer queries, clarify requirements     | 10:30 AM   | 12:30 PM | 2 hrs          |
| 3                             | Team Meetings              | Daily stand-up                           | 12:30 PM   | 1:00 PM  | 30 mins        |
| 4                             | Issue Tracking             | Monitor development progress/issues      | 3:00 PM    | 5:30 PM  | 2.5 hrs        |
| Time                          |                            |                                          |            |          | Total<br>6 hrs |

| Testing Timesheet of a BA |                           |                                          |            |          |          |
|---------------------------|---------------------------|------------------------------------------|------------|----------|----------|
| S. No                     | Tasks                     | Actionable Items                         | Start time | End time | Duration |
| 1                         | Test Scenario Preparation | Prepare test cases based on requirements | 9:30 AM    | 11:30 AM | 1.5 hrs  |
| 2                         | Test Case Review          | Review test cases with QA team.          | 11:30 AM   | 12:15 PM | 45 mins  |
| 3                         | Team Meetings             | Daily stand-up                           | 12:30 PM   | 1:00 PM  | 30 mins  |
| 4                         | Defect Verification       | Check defects reported by QA             | 2:00 PM    | 3:30 PM  | 1.5 hrs  |
| 5                         | Document Testing Updates  | Update requirement and test documents    | 3:30 PM    | 5:00 PM  | 1.5 hr   |
| Time Total                |                           |                                          |            |          | 5.5 hrs  |

| UAT Timesheet of a BA |                          |                                             |            |          |          |
|-----------------------|--------------------------|---------------------------------------------|------------|----------|----------|
| S. No                 | Tasks                    | Actionable Items                            | Start time | End time | Duration |
| 1                     | Coordinate with Users    | Schedule UAT sessions with client/end users | 9:30 AM    | 10:30 AM | 1 hr     |
| 2                     | UAT Support /Guide Users | Help users execute test cases               | 10:30 AM   | 12:30 PM | 2 hrs    |
| 3                     | Team Meetings            | Daily stand-up                              | 12:30 PM   | 1:00 PM  | 30 mins  |
| 4                     | Follow-up Clarifications | Discuss issues with development or QA team  | 2:00 PM    | 4:00 PM  | 2 hrs    |
| 5                     | Collect UAT Sign-off     | Get approvals and finalize UAT report       | 4:00 PM    | 5:00 PM  | 1.5 hr   |
| Time Total            |                          |                                             |            |          | 7 hrs    |

| Deployment n Implementation Timesheet of a BA |                        |                                                |            |          |          |
|-----------------------------------------------|------------------------|------------------------------------------------|------------|----------|----------|
| S. No                                         | Tasks                  | Actionable Items                               | Start time | End time | Duration |
| 1                                             | Deployment Preparation | Prepare deployment checklist and handover docs | 9:30 AM    | 11:00 AM | 1.5 hrs  |

|      |                                           |                                               |          |          |                |
|------|-------------------------------------------|-----------------------------------------------|----------|----------|----------------|
| 2    | Coordinate with IT team, dev, tester Team | Assist IT team/Dev & tester during deployment | 11:00 AM | 12:30 PM | 1.5 hrs        |
| 3    | Team Meetings                             | Daily stand-up                                | 12:30 PM | 1:00 PM  | 30 mins        |
| 4    | Post-Deployment Verification              | Check system functionality after deployment   | 2:00 PM  | 3:30 PM  | 1.5 hrs        |
| 5    | Client Handover & Support                 | Provide guidance, address immediate queries   | 3:30 PM  | 5:30 PM  | 2 hrs          |
| Time |                                           |                                               |          |          | Total<br>7 hrs |

