**Question 1 – BPM - 5 Marks**

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

**Ans) Business Process Model for Online Agriculture Store**:

* **Goal**: The primary goal is to provide an online platform that connects farmers in remote areas with manufacturers of agricultural products (fertilizers, seeds, pesticides), allowing them to procure essential supplies easily.
* **Inputs**:
	+ Manufacturer’s product details (fertilizers, seeds, pesticides)
	+ Farmer’s requests/orders for products
* **Resources**:
	+ A functional web or mobile application
	+ Technical support (Java developers, network and database admins)
	+ A financial budget of 2 Crores INR
	+ Stakeholders (Mr. Henry, Peter, Kevin, Ben, and companies)
* **Outputs**:
	+ Successful product listings on the platform
	+ Orders placed by farmers
	+ Product delivery to farmers
* **Activities**:
	+ Manufacturers upload product details
	+ Farmers browse and select products
	+ Orders are processed, payments are made, and deliveries are coordinated
* **Value Created**:
	+ Easy access for farmers to essential supplies
	+ Reduced reliance on intermediaries
	+ Timely delivery and cost reduction for agricultural inputs

**Question 2 – SWOT - 5 Marks**

**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**

**Ans) SWOT Analysis for Mr. Karthik**:

|  |  |
| --- | --- |
| * **Strengths**:
	+ A large talent pool of skilled developers, testers, and support staff in APT IT Solutions
	+ A significant budget of 2 Crores INR, providing financial stability
	+ Clear requirements and support from key stakeholders
 | * **Weaknesses**:
	+ Internet connectivity issues in remote rural areas
	+ Limited timeframe of 18 months for project completion, which may be tight given the scope
	+ Farmers may have limited technical literacy, necessitating extensive user support
 |
| * **Opportunities**:
	+ Potential expansion into other agricultural sectors (e.g., machinery, consultancy services)
	+ The possibility of scaling to serve larger geographical areas or international markets
	+ Positive CSR impact, improving the company’s reputation
 | * **Threats**:
	+ Potential delays in project delivery due to unforeseen challenges
	+ Competition from other similar platforms
	+ Resistance to technology adoption by farmers
 |

**Question 3 – Feasibility study - 5 Marks**

**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.**

**Ans)** For the feasibility study on using **Java Technology**, Mr. Karthik should evaluate:

* **Hardware**: Ensure robust servers, data storage, and backups to handle large volumes of data and user activity.
* **Software**: Use Java-based frameworks (like Spring Boot) for scalable development, with MySQL/PostgreSQL databases for data management, and robust testing tools such as JUnit.
* **Trained Resources**: APT IT Solutions has an experienced team of Java developers, testers, network admins, and DB admins, ensuring skilled resources are available.
* **Budget**: The 2 Crore INR budget needs to cover development, testing, infrastructure, deployment, and ongoing maintenance costs.
* **Time Frame**: The project must be delivered within 18 months, so careful planning and timeline management are essential to avoid overruns.

**Question 4 – Gap Analysis - 5 Marks**

**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**

**Ans) Gap Analysis**: Compare the AS-IS process (current situation) with the TO-BE process (future system).

* **AS-IS**:
	+ Farmers rely on local vendors for their needs, which often leads to higher costs and delays in obtaining fertilizers, seeds, and pesticides.
	+ No direct communication with manufacturers, leading to a lack of transparency and inefficiency.
* **TO-BE**:
	+ Farmers use an online platform to purchase products directly from manufacturers, reducing the middleman’s involvement.
	+ The process becomes streamlined, allowing faster delivery and better pricing, improving productivity for the farmers.

**Question 5 – Risk Analysis - 10 Marks**

**List down different risk factors that may be involved (BA Risks And process/Project Risks)**

**Ans) Risk Factors**:

### ****Business Analyst Risks (BA Risks)****

1. **Inadequate Requirements Gathering**:
	* Risk of missing critical requirements due to ineffective communication with stakeholders, which may lead to project rework and delays.
2. **Changing Stakeholder Expectations**:
	* Stakeholders may change their requirements or expectations during the project lifecycle, leading to scope creep.
3. **Limited Technical Understanding**:
	* The BA may lack a deep understanding of the technology being implemented (Java), potentially affecting the quality of requirements.
4. **Insufficient User Testing**:
	* If the BA does not involve end-users in testing early and frequently, important usability issues may be identified too late.
5. **Stakeholder Engagement**:
	* Failure to effectively engage all relevant stakeholders may lead to resistance or lack of buy-in during project implementation.

### ****Process/Project Risks****

1. **Technical Risks**:
	* Potential challenges in integrating with existing systems or third-party APIs, which could delay development.
2. **Budget Overruns**:
	* The project may exceed its budget of 2 Crores INR due to unforeseen expenses or changes in project scope.
3. **Timeline Delays**:
	* The project timeline may be affected by delays in development, testing, or stakeholder feedback, pushing completion beyond the planned 18 months.
4. **Resource Availability**:
	* Key resources (developers, testers) may not be available as planned due to other commitments or unforeseen circumstances, impacting project delivery.
5. **Quality Assurance Risks**:
	* Insufficient quality assurance processes may result in a low-quality product that does not meet user needs or business objectives.
6. **Regulatory Compliance**:
	* Failing to comply with agricultural and e-commerce regulations could result in legal issues or penalties.
7. **Market Competition**:
	* New competitors entering the online agriculture space may impact the market share and user adoption rates of the platform.
8. **User Adoption**:
	* Resistance from farmers to adopt the new technology due to lack of familiarity or trust in online transactions may hinder the platform's success.
9. **Cybersecurity Threats**:
	* Potential threats to data security, including hacking or data breaches, could undermine user trust and lead to financial losses.
10. **Economic Changes**:
	* Fluctuations in the economy that affect farmers' purchasing power may impact sales of products through the platform.

### ****Conclusion****

The identification and analysis of these risks will enable the project team to develop mitigation strategies and contingency plans to address potential issues before they arise. By proactively managing these risks, Mr. Karthik and the project team can enhance the likelihood of success for the Online Agriculture Products Store.

**Question 6 – Stakeholder Analysis (RACI Matrix) - 8 Marks**

**Perform stakeholder analysis (RACI Matrix) to find out the key stakeholders who can take Decisions and Who are the influencers RACI Matrix**:

### Ans)RACI Matrix for Online Agriculture Products Store

| **Task/Phase** | **Mr. Henry (Sponsor)** | **Mr. Pandu (Finance Head)** | **Mr. Dooku (Project Coordinator)** | **Mr. Karthik (Delivery Head)** | **Mr. Vandanam (Project Manager)** | **Peter, Kevin, Ben (Farmers)** | **APT IT SOLUTIONS Team (Developers)** | **BA (Business Analyst)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Initiation of Project** | A | R | C | I | I | I | I | I |
| **Budget Approval** | A | R | C | I | I | I | I | I |
| **Requirements Gathering** | I | I | I | C | R | C | I | A |
| **Design Phase** | I | I | I | I | R | I | C | A |
| **Development Phase** | I | I | I | C | R | I | A | C |
| **Testing Phase** | I | I | I | I | R | C | A | C |
| **User Acceptance Testing (UAT)** | I | I | I | I | R | A | C | R |
| **Go-Live/Implementation** | A | I | I | I | R | I | C | I |
| **Post-Go-Live Support** | I | I | I | C | R | I | A | C |

**Explanation of Roles in the RACI Matrix:**

* **R (Responsible)**: The individual(s) who perform the task or make it happen. They are responsible for getting the work done.
* **A (Accountable)**: The individual(s) who are ultimately accountable for the task or decision. They sign off on the work and ensure completion.
* **C (Consulted)**: The individual(s) who provide input or expertise during a task. Their feedback is considered before making a decision.
* **I (Informed)**: The individual(s) who are kept informed about progress or decisions but are not directly involved in the task.

**Key Stakeholders:**

1. **Mr. Henry (Sponsor)**: The primary decision-maker and accountable party for the success of the project.
2. **Mr. Pandu (Finance Head)**: Responsible for budget approval and overseeing financial aspects.
3. **Mr. Dooku (Project Coordinator)**: Consulted for coordination between the various project components.
4. **Mr. Karthik (Delivery Head)**: Consulted for overall delivery strategy, ensuring alignment with project goals.
5. **Mr. Vandanam (Project Manager)**: Responsible for managing the project and ensuring that all phases are executed successfully.
6. **Peter, Kevin, Ben (Farmers)**: The end-users and key stakeholders, providing requirements and feedback during UAT.
7. **APT IT SOLUTIONS Team (Developers)**: Responsible for the development and technical execution of the project.
8. **BA (Business Analyst)**: Responsible for gathering requirements, ensuring design meets business needs, and overall communication with stakeholders.

**Question 7 – Business Case Document - 8 Marks**

**Help Mr Karthik to prepare a business case document**

**Ans) Business Case for Online Agriculture Products Store**

### ****1. Executive Summary****

The **Online Agriculture Products Store** project aims to solve critical challenges faced by farmers in remote areas who have difficulty procuring essential agricultural products like fertilizers, seeds, and pesticides. The proposed solution will be a user-friendly online platform where farmers can connect directly with suppliers. The project is initiated as a CSR initiative by Mr. Henry, executed by APT IT Solutions, and funded by SOONY Company.

### ****2. Problem Statement****

Farmers in remote areas, such as Peter, Kevin, and Ben, face challenges in obtaining agricultural products due to geographic and supply chain limitations. These issues are prevalent across various farming communities, affecting productivity and crop health. The existing process relies heavily on middlemen and local suppliers, which leads to higher costs and delays.

### ****3. Objectives****

* Provide farmers direct access to manufacturers of fertilizers, seeds, and pesticides through an online platform.
* Simplify the procurement process by allowing online browsing, selection, and purchase.
* Enable farmers to receive deliveries directly to their location.
* Improve productivity and reduce costs for farmers by eliminating middlemen.

### ****4. Scope of the Project****

The scope includes:

* Developing a web and mobile application for the Online Agriculture Products Store.
* Integrating supplier and farmer communication features.
* Providing functionalities for product browsing, order placement, payment, and delivery tracking.
* Ensuring ease of use with a focus on user experience for farmers with limited technical skills.

### ****5. Business Benefits****

* **Direct access to suppliers**: Farmers can procure fertilizers, seeds, and pesticides at lower costs by eliminating intermediaries.
* **Improved supply chain**: The platform will streamline the procurement process, reducing delays.
* **Scalability**: The platform will be scalable to support additional suppliers and regions over time.
* **CSR Impact**: The project will contribute to the development of rural communities, improving agricultural efficiency and economic growth.

### ****6. Stakeholder Analysis****

* **Primary Stakeholders**: Farmers (end users), Manufacturers (product suppliers), Mr. Henry (project sponsor)
* **Secondary Stakeholders**: SOONY Company, Peter, Kevin, Ben (farmer representatives), APT IT Solutions, Project Committee (Mr. Pandu, Mr. Dooku)
* **Key Project Roles**: Mr. Karthik (Delivery Head), Mr. Vandanam (Project Manager), Business Analyst (You), Developers, Testers, Network Admin, DB Admin

### ****7. Cost-Benefit Analysis****

* **Total Budget**: 2 Crores INR
* **Costs**: Development, testing, infrastructure, and maintenance.
* **Benefits**: Reduction in operational costs for farmers, faster delivery of products, increased agricultural yield, and a broader market reach for suppliers.
* **ROI**: The platform is expected to generate returns in the form of reduced costs for farmers and better margins for manufacturers by cutting intermediaries.

### ****8. Risk Analysis****

* **Technology Risks**: Platform performance issues due to poor internet in remote areas.
* **User Adoption Risk**: Farmers may face challenges adapting to the new system.
* **Data Security**: Protecting transaction and user data from potential breaches.
* **Operational Risks**: Delays in project timelines or budget overruns. Mitigation strategies will be developed for each identified risk.

### ****9. Timeline****

The project is expected to be completed in **18 months**, with key phases:

* **Requirements Gathering**: 2 months
* **Design**: 3 months
* **Development**: 8 months (including sprints for D1-D4)
* **Testing**: 4 months (T1-T4)
* **User Acceptance Testing (UAT)**: 1 month
* **Deployment**: End of the project.

### ****10. Feasibility Study****

* **Technical Feasibility**: The platform will be developed using Java with the talent pool available in APT IT Solutions. Existing infrastructure supports the scope of the project.
* **Financial Feasibility**: With a budget of 2 Crores INR, the financial resources are sufficient for the project’s completion.
* **Operational Feasibility**: The project aligns with SOONY’s CSR initiative and will be managed by experienced personnel.

### ****11. Recommendations****

Based on the above analysis, it is recommended that the project proceeds. The solution addresses a critical problem for farmers, improves agricultural practices, and aligns with SOONY’s CSR goals. With proper planning and risk mitigation, the project is expected to succeed within the given budget and timeline.

**Question 8 – Four SDLC Methodologies - 8 Marks**

**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**

**Ans)** In Software Development Life Cycle (SDLC), there are four common methodologies that can be considered for any project: **Sequential**, **Iterative**, **Evolutionary**, and **Agile**. Here is an explanation of each methodology, along with its pros and cons, which can help Mr. Henry, Mr. Pandu, Mr. Dooku, and Mr. Karthik in selecting the appropriate development approach for the Online Agriculture Products Store project.

**1. Sequential (Waterfall) Methodology**

The Sequential or Waterfall model is a traditional SDLC approach where development follows a linear progression. It consists of clearly defined stages such as **Requirements**, **Design**, **Implementation**, **Testing**, and **Deployment**. Each phase is completed before moving to the next, and changes after completion are difficult.

* **Pros**:
	+ Well-defined and structured process.
	+ Easy to manage, with milestones clearly defined.
	+ Suitable for small or simple projects with clear requirements.
* **Cons**:
	+ Not flexible to accommodate changes once a stage is completed.
	+ Testing is done late in the cycle, so issues are discovered only at the end.
	+ Not ideal for large, complex projects where requirements may evolve.
* **When to use**: When the requirements are well-defined and not likely to change, and the project is relatively straightforward.

**2. Iterative Methodology**

The Iterative model involves developing the system incrementally, with each iteration refining and improving the system. In each iteration, the system is designed, developed, and tested, and feedback is used for subsequent iterations.

* **Pros**:
	+ Allows for early detection of issues as testing happens throughout the process.
	+ Changes and refinements can be made during each iteration based on feedback.
	+ Risks are mitigated as the system is built gradually.
* **Cons**:
	+ Can lead to scope creep if changes are made frequently.
	+ Requires good management of feedback and iterations to avoid confusion.
* **When to use**: When the requirements are not fully known at the start, and flexibility is needed to refine the project progressively.

**3. Evolutionary Methodology**

The Evolutionary approach focuses on building an initial basic version of the system and then continuously enhancing it based on user feedback and additional requirements. The project evolves over time through multiple iterations, and working prototypes are delivered early.

* **Pros**:
	+ Users get to see working versions early, which improves feedback and user satisfaction.
	+ Good for projects where requirements are unclear or may change over time.
	+ High flexibility in incorporating new features during each iteration.
* **Cons**:
	+ Can be difficult to predict final project timelines and costs.
	+ Requires frequent client and stakeholder interaction, which can increase complexity.
* **When to use**: When requirements are expected to evolve and the project needs continuous improvements and enhancements over time.

**4. Agile Methodology**

Agile is a flexible, iterative approach where development is broken into small cycles called **sprints**. Teams work in short cycles (typically 2-4 weeks), producing a functional part of the system at the end of each sprint. Agile promotes continuous feedback, collaboration, and incremental delivery.

* **Pros**:
	+ Highly flexible and adaptable to changing requirements.
	+ Promotes collaboration between developers, testers, and business stakeholders.
	+ Regular feedback and testing ensure high-quality outputs.
	+ Faster time-to-market with incremental releases.
* **Cons**:
	+ Requires experienced team members with the ability to self-manage.
	+ High client involvement needed throughout the process.
	+ Can lead to scope creep if changes are not properly managed.
* **When to use**: Ideal for dynamic, fast-changing projects where the scope and requirements may not be fully defined at the start and need continuous adaptation.

**Question 9 – Waterfall RUP Spiral and Scrum Models – 8 Marks**

**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?**

**Ans) 1. Waterfall Model**

The **Waterfall** model is a traditional, linear approach where each phase of the project must be completed before moving to the next. Phases include **Requirements**, **Design**, **Development**, **Testing**, and **Deployment**. It’s a sequential model with minimal room for changes once a phase is complete.

* **Pros**:
	+ Clear structure and process flow.
	+ Easy to manage with predefined milestones.
	+ Works well when requirements are well-defined upfront.
* **Cons**:
	+ Inflexible to changes after phases are completed.
	+ Testing occurs only after development, which may lead to late discovery of issues.
	+ Not suitable for projects with evolving requirements.
* **Suitability for this project**: The **Waterfall model** might work well for small-scale projects with clearly defined requirements. However, since this project might need flexibility and iterative feedback (given the involvement of farmers, manufacturers, and multiple stakeholders), this model could be too rigid.

**2. Rational Unified Process (RUP)**

The **RUP** model is an **iterative and incremental** approach, developed by IBM. It divides the SDLC into four phases: **Inception**, **Elaboration**, **Construction**, and **Transition**. RUP focuses on the iterative refinement of the system, allowing feedback and changes throughout the process.

* **Pros**:
	+ Flexibility in accommodating changing requirements.
	+ Continuous feedback loops with iterations in each phase.
	+ Clear documentation and structured deliverables.
* **Cons**:
	+ Requires more oversight and project management.
	+ May become complex and costly for smaller teams or simpler projects.
* **Suitability for this project**: **RUP** is beneficial for large-scale, complex projects where requirements might change over time. The iterative nature allows for refinements, which could benefit the Online Agriculture Store. However, it may require a higher budget and additional management overhead.

**3. Spiral Model**

The **Spiral** model combines elements of both **Waterfall** and **Iterative** approaches. It emphasizes risk analysis and is broken into cycles, each involving the phases of **planning**, **risk analysis**, **engineering**, and **evaluation**. Each cycle improves upon the previous one.

* **Pros**:
	+ Excellent for managing risk, as each cycle involves risk assessment.
	+ Highly flexible and adaptive to changing requirements.
	+ Delivers early prototypes, allowing for feedback and adjustment.
* **Cons**:
	+ Can be costly and time-consuming due to its focus on risk management.
	+ Complex to manage, requiring experienced teams.
* **Suitability for this project**: The **Spiral model** could be beneficial for projects with significant unknowns and risks. Since this project is relatively straightforward in terms of risks and scope, the Spiral model might introduce unnecessary complexity.

**4. Scrum Model**

**Scrum** is an **Agile framework** that emphasizes iterative development with short cycles called **sprints**, which usually last 2–4 weeks. At the end of each sprint, a functional product increment is delivered, and the team receives feedback for the next sprint.

* **Pros**:
	+ Highly flexible, allowing for continuous feedback and adaptation.
	+ Encourages collaboration between stakeholders, developers, and users.
	+ Focuses on delivering working product increments quickly.
* **Cons**:
	+ Requires a high level of involvement from all stakeholders.
	+ Can be difficult to manage scope and timelines if not handled properly.
* **Suitability for this project**: **Scrum** would work well for this project if frequent feedback from farmers and stakeholders is required and there is a need for delivering functional product increments at regular intervals. However, it requires strong team collaboration and client involvement.

**Difference of Opinion: V-Model vs. Waterfall Model**

* **V-Model**: The **V-Model** is an extension of the Waterfall model, but it emphasizes **verification** and **validation** at each stage. Each phase of development has a corresponding testing phase, ensuring that testing is integrated throughout the process. This model is more structured and emphasizes quality assurance.
* **Waterfall Model**: The **Waterfall model** is a simple linear approach without explicit focus on testing at each stage. Testing occurs only after development is complete.

**Recommendation: V-Model over Waterfall**

As a **Business Analyst**, I would recommend the **V-Model** for this project because:

1. **Testing is Crucial**: Given that this project will directly affect farmers' ability to procure essential agricultural products, ensuring the reliability and usability of the system is critical. The V-Model allows testing at every phase of development, which is important for catching issues early.
2. **Quality Assurance**: The V-Model ensures that both verification and validation are embedded in each stage, which reduces the risk of last-minute surprises or flaws during the final testing phase.
3. **Clarity and Structure**: Like the Waterfall model, the V-Model has a clear structure, but it improves on Waterfall by integrating validation activities throughout, which reduces the likelihood of undetected errors until the end.

Given the importance of usability and accuracy for the farmers, who may not be highly tech-savvy, and the requirement for the project to function smoothly without major bugs, the **V-Model** offers a better balance between structure and testing.

**Conclusion:**

* **Waterfall** is too rigid for evolving projects like this.
* **RUP** and **Spiral** could be too complex and resource-heavy for this scope.
* **Scrum** is flexible but requires strong client involvement and rapid iteration cycles, which may not suit the project's scale.
* **V-Model** strikes a good balance between structured development and early testing, making it the best fit for the Online Agriculture Products Store project.

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**Question 10 – Waterfall Vs V-Model - 5 Marks Write down the differences between waterfall model and V model.**

**Ans)**

### ****Waterfall Model vs. V-Model****

Here are the key differences between the **Waterfall Model** and the **V-Model**:

| **Aspect** | **Waterfall Model** | **V-Model** |
| --- | --- | --- |
| **Process Flow** | Linear, sequential flow where one phase is completed before moving to the next. | Similar to Waterfall, but introduces parallel testing for each development phase. |
| **Testing Phase** | Testing is done only after the entire development phase is completed. | Testing is integrated at every stage of development, with corresponding test phases for each development activity. |
| **Feedback Loop** | Feedback is usually provided only after the testing phase at the end of the development. | Continuous feedback with a focus on early verification and validation. |
| **Risk of Errors** | Errors are typically detected later in the process, which can result in higher costs for fixes. | Errors are caught earlier due to parallel validation, reducing risk and rework. |
| **Best Suited For** | Projects with clearly defined requirements where changes are unlikely. | Projects that require rigorous testing and quality assurance at each stage of development. |
| **Flexibility** | Less flexible, changes are difficult to accommodate once a phase is complete. | Slightly more flexible in terms of validation but still less adaptable to changes compared to iterative models like Agile. |
| **Quality Assurance** | Quality assurance is not integrated into every phase; only occurs at the end during testing. | Ensures quality assurance by integrating testing at every stage, improving the final product quality. |

### ****Summary****:

* **Waterfall** is a simple, linear model where testing happens at the end, leading to potential delays in identifying errors.
* **V-Model** improves upon the Waterfall by including validation and testing at each development stage, leading to better error detection and improved product quality early on.

**Question 11 – Justify Your Choice (3 Marks)**

**As a BA, state your reason for choosing one model for this project**

**Ans) Justification for Choosing V-Model for this Project:**

As a Business Analyst, I would choose the **V-Model** for this project due to the following reasons:

1. **Early Detection of Errors**: Since the V-Model incorporates testing at every stage of development, any issues or discrepancies can be identified early, reducing the risk of costly fixes later in the process. This is crucial for a project involving diverse stakeholders like farmers and manufacturers where accuracy is essential.
2. **Rigorous Validation**: The V-Model ensures that for every development phase, there is a corresponding validation phase. This is important for ensuring that the functionalities (such as product listing, communication between farmers and companies) meet the specified requirements.
3. **Quality Assurance**: Given the importance of building a user-friendly and reliable platform for farmers in remote areas, the V-Model ensures high-quality outputs by integrating testing throughout the process. This aligns well with the project’s focus on delivering a robust, error-free system under a CSR initiative.

Thus, the V-Model balances development and testing effectively, ensuring both efficiency and quality.

**Question 12 – Gantt Chart - 5 Marks**

**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 theResources are PM, BA, Java Developers, testers, DB Admin, NW Admin.**

**Ans)** A Gantt chart visually represents the project timeline, showing the sequence of tasks, their duration, and the resources involved. For this project, following the V-Model, the stages are broken down into key phases with associated development and testing tasks. Below is a conceptual breakdown of how the Gantt chart would be structured, including roles such as Project Manager (PM), Business Analyst (BA), Java Developers, Testers, DB Admin, and Network Admin:

**Key Phases in the Gantt Chart:**

1. **RG (Requirement Gathering)**:
	* Duration: 2-3 weeks
	* Resources: PM, BA, Stakeholders (Peter, Kevin, Ben)
	* Task: Collecting detailed requirements from farmers and companies.
2. **RA (Requirement Analysis)**:
	* Duration: 1-2 weeks
	* Resources: PM, BA, Java Developers
	* Task: Analyzing and refining the requirements to be technically feasible.
3. **Design**:
	* Duration: 3-4 weeks
	* Resources: PM, BA, Java Developers, DB Admin, NW Admin
	* Task: Designing the system architecture, database schema, and application flow.
4. **D1 (Development Phase 1)**:
	* Duration: 4-6 weeks
	* Resources: Java Developers
	* Task: Development of core modules (e.g., User Management, Product Listings).
5. **T1 (Testing Phase 1)**:
	* Duration: 1-2 weeks
	* Resources: Testers, Java Developers
	* Task: Testing core modules developed in D1.
6. **D2 (Development Phase 2)**:
	* Duration: 4-6 weeks
	* Resources: Java Developers
	* Task: Development of additional modules (e.g., Order Processing, Payment Gateway).
7. **T2 (Testing Phase 2)**:
	* Duration: 1-2 weeks
	* Resources: Testers, Java Developers
	* Task: Testing modules developed in D2.
8. **D3 (Development Phase 3)**:
	* Duration: 4-6 weeks
	* Resources: Java Developers
	* Task: Development of remaining features (e.g., Notifications, Reports).
9. **T3 (Testing Phase 3)**:
	* Duration: 1-2 weeks
	* Resources: Testers, Java Developers
	* Task: Testing modules developed in D3.
10. **D4 (Development Phase 4)**:
	* Duration: 2-3 weeks
	* Resources: Java Developers
	* Task: Final tweaks and system integration.
11. **T4 (Testing Phase 4)**:
	* Duration: 1-2 weeks
	* Resources: Testers
	* Task: Final testing and quality checks.
12. **UAT (User Acceptance Testing)**:
	* Duration: 2 weeks
	* Resources: Testers, BA, Stakeholders (Farmers, Companies)
	* Task: Final validation and acceptance from end-users.

**Sample Gantt Chart Timeline:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Week 1 – 3** | **Week 3 – 5** | **Week 5 – 7** | **Week 7 – 9** | **Week 9– 11** | **Week 11-13** | **Week 13-15** | **Week 15-17** | **Week 17-18** |
| **RG** |  |  |  |  |  |  |  |  |  |
| **RA** |  |  |  |  |  |  |  |  |  |  |
| **Design** |  |  |  |  |  |  |  |  |  |
| **D1** |  |  |  |  |  |  |  |  |  |
| **T1** |  |  |  |  |  |  |  |  |  |  |
| **D2** |  |  |  |  |  |  |  |  |  |  |
| **T2** |  |  |  |  |  |  |  |  |  |  |
| **D3** |  |  |  |  |  |  |  |  |  |  |
| **T3** |  |  |  |  |  |  |  |  |  |  |
| **D4** |  |  |  |  |  |  |  |  |  |  |
| **T4** |  |  |  |  |  |  |  |  |  |
| **UAT** |  |  |  |  |  |  |  |  |  |

| **Task** | **Duration** | **Responsible** | **Dependencies** |
| --- | --- | --- | --- |
|  Requirement Gathering (RG) | 2-3 weeks | PM, BA, Stakeholders | None |
| Requirement Analysis (RA) | 1-2 weeks | PM, BA | RG |
| Design | 3-4 weeks | PM, Java Devs, DB Admin, NW Admin | RA |
| Development Phase 1 (D1) | 4-6 weeks | Java Developers | Design |
| Testing Phase 1 (T1) | 1-2 weeks | Testers | D1 |
| Development Phase 2 (D2) | 4-6 weeks | Java Developers | T1 |
| Testing Phase 2 (T2) | 1-2 weeks | Testers | D2 |
| Development Phase 3 (D3) | 4-6 weeks | Java Developers | T2 |
| Testing Phase 3 (T3) | 1-2 weeks | Testers | D3 |
| Development Phase4 (D4) | 2-3 weeks | Java Developers | T3 |
| Testing Phase 4 (T4) | 1-2 weeks | Testers | D4 |
| User Acceptance Testing (UAT) | 2 weeks | Testers, BA, Stakeholders | T4 |

In this Gantt chart, each phase follows a sequential order based on the V-Model, ensuring that for every development phase (D), there is a corresponding testing phase (T) immediately after.

**Question 13 – Fixed Bid Vs Billing - 5 Marks**

**Explain the difference between Fixed Bid and Billing projects .**

**Ans)**

1. **Fixed Bid Projects**:
	* **Definition**: A fixed bid project is a contract where the total project cost is predetermined, and the payment remains constant, regardless of the actual time or resources spent.
	* **Key Characteristics**:
		+ The scope, timeline, and budget are clearly defined before the project starts.
		+ The vendor assumes the risk of cost overruns.
		+ Any change in requirements or scope typically results in a change request with additional cost.
	* **Advantages**:
		+ Predictable cost for the client.
		+ Encourages efficiency on the vendor's side.
	* **Disadvantages**:
		+ May lack flexibility in responding to changes.
		+ Risk of reduced quality if the vendor tries to cut costs to stay within budget.
2. **Billing (Time and Materials) Projects**:
	* **Definition**: A billing or time-and-materials project is one where the client is charged based on the actual hours worked, plus any material costs.
	* **Key Characteristics**:
		+ The project cost is determined by the effort and resources used.
		+ Greater flexibility to adjust scope and requirements throughout the project.
		+ The client assumes the risk of cost overruns.
	* **Advantages**:
		+ Flexibility in terms of scope changes.
		+ Ideal for projects where requirements may evolve over time.
	* **Disadvantages**:
		+ Difficult to predict the final cost.
		+ Less incentive for the vendor to be efficient.

In summary, **fixed bid** projects offer cost predictability but are rigid in scope, while **billing** projects provide flexibility but come with cost uncertainty.

**Question 14 – Preparer Timesheets of a BA in various stages of SDLC - 20 marks**

**➢ 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**

**Ans)** A Business Analyst (BA) plays a crucial role throughout the Software Development Life Cycle (SDLC), performing distinct tasks during each phase. Below is a detailed breakdown of a BA's timesheet during various stages of SDLC:

**1. Design Phase Timesheet of a BA**

In the **design phase**, the BA focuses on transforming the requirements into functional specifications. Key activities involve:

| **Activity** | **Time Spent (in hours)** |
| --- | --- |
| Requirement Gathering Workshops | 8 hours |
| Functional Specification Documentation | 12 hours |
| Reviewing Requirements with Stakeholders | 4 hours |
| Creating Use Case Diagrams | 6 hours |
| Facilitating Design Sessions | 5 hours |
| Finalizing Functional Design | 5 hours |
| Review and Approval of Design Documents | 3 hours |
| **Total Hours for Design Phase** | **43 hours** |

**2. Development Phase Timesheet of a BA**

During the **development phase**, the BA supports developers by clarifying requirements and ensuring alignment between the functional specifications and actual development.

| **Activity** | **Time Spent (in hours)** |
| --- | --- |
| Clarifying Requirements with Developers | 8 hours |
| Conducting Requirement Walkthroughs | 4 hours |
| Ensuring Traceability Matrix Updates | 5 hours |
| Attending Scrum/Stand-Up Meetings | 3 hours |
| Reviewing Technical Documents | 4 hours |
| Liaising with Stakeholders for Clarifications | 6 hours |
| **Total Hours for Development Phase** | **30 hours** |

**3. Testing Phase Timesheet of a BA**

In the **testing phase**, the BA ensures that the system meets business requirements by participating in testing activities.

| **Activity** | **Time Spent (in hours)** |
| --- | --- |
| Creating Test Scenarios and Scripts | 8 hours |
| Validating Test Cases Against Requirements | 6 hours |
| Coordinating with QA Team | 5 hours |
| Conducting User Acceptance Testing (UAT) Preparations | 7 hours |
| Reviewing Test Results and Providing Feedback | 6 hours |
| **Total Hours for Testing Phase** | **32 hours** |

**4. UAT Phase Timesheet of a BA**

In the **UAT phase**, the BA facilitates and coordinates User Acceptance Testing, ensuring that the system meets business expectations.

| **Activity** | **Time Spent (in hours)** |
| --- | --- |
| Preparing UAT Test Cases | 5 hours |
| Coordinating UAT Sessions with Stakeholders | 7 hours |
| Facilitating Feedback Collection from Users | 6 hours |
| Validating UAT Results with Project Team | 5 hours |
| Updating Requirement Traceability Matrix | 4 hours |
| **Total Hours for UAT Phase** | **27 hours** |

**5. Deployment and Implementation Timesheet of a BA**

In the **deployment and implementation phase**, the BA ensures the system’s readiness for go-live and provides post-deployment support.

| **Activity** | **Time Spent (in hours)** |
| --- | --- |
| Supporting Deployment Planning Sessions | 4 hours |
| Reviewing Cutover Plans | 3 hours |
| Conducting Post-Implementation Reviews | 6 hours |
| Monitoring Production Environment | 5 hours |
| Gathering Feedback for Further Improvements | 5 hours |
| **Total Hours for Deployment and Implementation Phase** | **23 hours** |

**Summary of Total Hours**

| **SDLC Phase** | **Total Hours** |
| --- | --- |
| Design Phase | 43 hours |
| Development Phase | 30 hours |
| Testing Phase | 32 hours |
| UAT Phase | 27 hours |
| Deployment & Implementation | 23 hours |
| **Total Hours for BA across SDLC** | **155 hours** |

**Explanation:**

* The **design phase** is the most time-intensive, as it involves gathering requirements, creating functional specifications, and ensuring alignment between stakeholders.
* During the **development phase**, the BA provides ongoing support to developers, clarifies requirements, and ensures the project stays on track.
* The **testing phase** requires active involvement in validating test cases and ensuring they align with the documented requirements.
* The **UAT phase** is crucial for ensuring business users validate the final product and provide feedback.
* Finally, during the **deployment and implementation phase**, the BA ensures a smooth go-live process and provides post-deployment support to address any issues that arise.