CAPSTONE PROJECT -1 ONLINE AGRICULTURE PRODUCT

Question 1 – BPM - 5 Marks

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

Answer – 1

Business Process Model for Online Agriculture Store-

Goal- As in the given scenario, Henry is a successful businessman who wants to do something for society. For that, he visited his friend's village, where he found that most villagers faced the problem of finding good-quality pesticides, fertilizers, and seeds. So he decided to build an online store to facilitate farmers to buy seeds, pesticides, and fertilizers from anywhere through internet connectivity.

Inputs- The Application should be designed user-friendly so that any new user can use it easily. The application should accept the project details from the manufacturer and display them to farmers. Farmers also browse the product in the application and select it according to their needs. Manufacturers accept the order and deliver it to the farmer's location.

Resources- Mr. Henry has given the project through his company SOONY. He formed a committee with the help of Mr. Pandu and Mr. Dooku and gave his project to APT IT Solutions company for a budget of 2 Cr. and time duration is 18 months.

Outputs- The output of this project is an Online Store that gives the features of farmer registration, manufacturer registration, product listing, browsing, order placement, and delivery management.

Activities- This project includes many activities-

- Requirement gathering- They need to find out the specific needs and challenges faced by the farmers.
- Design- This online store should be design in such a way that it is used by anyone easily. It should user friendly.
- Development- In this stage mobile store should be designed using specific technologies that integrate product catalog and search functionality .
- Testing- In this phase, we test the usability, functionality, and security of the app.
- Deployment- Launch the app for the farmers and manufacturers.

Value created for the end customers- This project helps many farmers who face the problem of getting good quality fertilizers, pesticides, seeds, and other farming products. It acts as a link between farmers and manufacturers. It helps both of them. It gives accessibility to farmers who live in remote areas.

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.

Answer 2-

SWOT analysis helps to analyze the strengths, weaknesses, opportunities, and threats of the project that helps to develop the mobile app.

Strengths- One of the strengths of this project is that it is a CSR activity. The project is supported by a well-established firm and it has all the resources available that the company needs to develop the app. It has good human resources with their expertise and experience. This project is also supported by good stakeholders.

Weakness- The success of this project wholly depends on the connectivity of the internet. They also face the logistical challenges of delivering the product to the customer. Farmers and manufacturers may hesitate in using new technology. They need training in using the app.

Opportunity- It covers that part of society that is not seen by anyone. It helps the lacs of farmers and gets the first moving advantage by establishing this mobile app. They also collect the farmers' data and their buying habits that helps to introduce new products.

Threats- This mobile app is made for farmers who are basically live in rural areas where internet connectivity is not good and this app needs good connectivity of internet. It also faces challenges from government policies related to farming products or e-commerce business. Cybersecurity is also a challenge for the success of the project. Supply chain management is also one the challenge in this project.

Question 3 – Feasibility study - 5 Marks

Mr. Karthik is trying to do a feasibility study on this project in Technology (Java), Please help him with points (HW SW Trained Resources Budget Time frame) to consider in the feasibility Study..

Answer 3-

Hardware Requirement- It needed high-performance development machines for developers like SSD, 8GB RAM, and multicore processors. It also needed cloud-based or on-premises server to host the application.

Software Requirement- Java spring boot for backend development. React and Angular for fronted development. My SQL for structured data. Git for source code management.

Trained Resources- This project needs JAVA developers, frontend developers, database administrators, QA testers, a Project Manager, Support team.

Budget- Budget should be divided in such a way that it covers all cost that in purchasing hardware, taking software licences, paying salaries to human resources, and allocate some funds to contingency fund.

Time Frame- 18 months as agreed in CSR initiative.

Requirement Gathering- 2months

Design-2-3 months

Development – 8-10 months

Testing – 3-4 months

Deployment- 1 months

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.

Answer 4-

GAAP Analysis helps to find out the GAAP of the current situation with the future situation.

Current Situation:

Challenges- Farmers face difficulties in finding products like fertilizers, seeds, and pesticides. They totally depend on local vendors and intermediaries which leads to high costs.

Accessibility- Farmers have limited access to the products that live in remote areas.

Communication Gap- There is a communication gap between farmers and manufacturers they rely on intermediaries.

Product knowledge- Farmers have limited knowledge about the products availability. They also don't know the product specifications.

Time-consuming- At this stage product delivery is very time-consuming from purchasing the product to making delivery of the product.

Expected Situation or Future situation-

Streamlined Procurement- Farmers can purchase the product directly from the manufactures that helps to eliminate the intermediaries.

Accessibility- Remote can access the platform through web or app and purchase the product from anywhere

Communication- With the help of these products manufacturers can communicate directly to the consumers.

Product Information Availability- Mobile app shows all the products available and there information so that farmers can purchase the product according to their requirement.

Automated Process- Digital ordering, payment and delivery tracking reduce manual effort.

Question 5 – Risk Analysis - 10 Marks

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

Answer 5-

Following are some risk factors that are involved in projects.

Business Analyst risk-

Incomplete requirement gathering- Missing key requirement gathering from stakeholders like farmers and manufacturers.

Miscommunication- Requirements are misunderstood or poorly documented leading to mismatched expectations.

Scope Creep- Uncontrolled addition of features beyond the initial project scope. Like adding some feature that are not understood by the farmers.

Stakeholders Conflicts- Conflicting priorities among stakeholders (farmers, manufacturers, sponsors). Farmers priorities are to get affordable products and manufacturers prioritize brand visibility.

Lack of domain knowledge- Insufficient understanding of agricultural practices and supply chain operations.

Project Risk-

Resource risk- Shortage or lack of Java developers testers or network administrators.

Technical risk- The platform may not support increasing numbers of users and transactions. They system may crashes during peak farming season due to heavy usage.

Financial risk- Exceeding 2 cr. Budget due to unplanned cost.

Time related risk- Project may delay due to unforeseen risk or it may not complted on given time frame.

Logistical challenges- inability to timely delivery of the product to remote areas.

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.

Answer 6-

RACI Matrix means-

- **R**: Responsible – Individuals who perform the task or activity.
- **A**: Accountable – The decision-maker who owns the task and ensures completion.
- **C**: Consulted – People whose opinions are sought; subject matter experts and advisors.
- **I**: Informed – Individuals kept up-to-date on progress and outcomes.

Stakeholder	Role	Responsibilities	RACI Role
Mr. Henry	Project Sponsor	Final decision-maker, approves funding, and sets the vision for the CSR initiative.	A
Mr. Pandu	Financial Head (SOONY)	Monitors project budget and ensures financial feasibility.	C
Mr. Dooku	Project Coordinator (SOONY)	Coordinates between stakeholders, tracks progress, and resolves conflicts.	R/A
Peter, Kevin, and Ben	Stakeholders (Farmers)	Provide input on requirements, validate deliverables to ensure usability.	C/I
APT IT Solutions	Project Delivery Organization	Delivers the project under agreed budget, timeline, and quality.	R
Mr. Karthik	Delivery Head (APT IT Solutions)	Oversees the project, ensures resources are available, and delivers the solution.	A
Mr. Vandanam	Project Manager (APT IT Solutions)	Manages day-to-day activities, timeline, and risk mitigation.	R
Ms. Juhi	Senior Java Developer	Leads technical development and ensures adherence to standards.	R
Java Development Team	Developers (APT IT Solutions)	Develops the platform's features (backend, frontend, APIs).	R

Mr. Mike	Network Administrator	Handles system deployment, infrastructure setup, and network security.	R
Mr. John	Database Administrator	Designs and maintains the database, ensures data integrity and performance.	R
Mr. Jason & Ms. Alekya	Testers	Perform testing to ensure quality, functionality, and performance.	R
Farmers (General Users)	End Users	Utilize the platform and provide feedback for continuous improvement.	I
Manufacturers	Product Suppliers	Provide product information and ensure timely delivery.	C/I

Question 7 – Business Case Document - 8 Marks

Help Mr Karthik to prepare a business case document.

Answer 7-

Business case document prepared by Kartik.

Aim of the Project- The proposed project aims to develop an online agriculture product store to address challenges faced by farmers in remote areas. The platform will connect farmers directly with manufacturers of fertilizers, seeds, and pesticides, enabling them to procure quality products efficiently.

Current Problems- Farmers like Peter, Kevin, and Ben struggle to procure essential agricultural inputs due to:

- Limited access to quality products.
- Dependency on intermediaries leading to higher costs.
- Lack of product information and pricing transparency.

Primary Goal-To create a user-friendly online platform where farmers can purchase fertilizers, seeds, and pesticides directly from manufacturers.

- Provide a scalable and secure platform accessible to farmers in remote areas.
- Enhance transparency in pricing and product availability.
- Reduce costs by eliminating intermediaries.
- Facilitate timely delivery through an integrated logistics system.

Resources Required-

- Hardware Requirement- It needed high-performance development machines for developers like SSD, 8GB RAM, and multicore processors.
- Software Requirement- Java spring boot for backend development. React and Angular for fronted development. My SQL for structured data. Git for source code management.
- Trained Resources- This project needs JAVA developers, frontend developers, database administrators, QA testers, a Project Manager, Support team.
- Budget- Budget should be divided in such a way that it covers all cost that in purchasing hardware, taking software licences, paying salaries to human resources.

Time Frame- 18 months as agreed in CSR initiative.

Requirement Gathering	-	2months
Design	-	2-3 months
Development	-	8-10 months
Testing	-	3-4 months
Deployment	-	1 months

Key Stakeholders

- **SOONY Leadership**: Mr. Henry (Sponsor), Mr. Pandu (Financial Head), Mr. Dooku (Project Coordinator).
- **Farmers**: End users like Peter, Kevin, and Ben, along with other farmers in remote areas.
- **Manufacturers**: Suppliers of fertilizers, seeds, and pesticides.
- **APT IT Solutions**: Delivery team, including Mr. Karthik (Delivery Head), Mr. Vandanam (Project Manager), developers, testers, and admins.

Conclusion

The online agriculture store will bridge the gap between farmers and manufacturers, addressing procurement challenges and enhancing productivity. It aligns with SOONY's CSR objectives and has the potential to make a significant social and economic impact.

Question 8 – Four SDLC Methodologies - 8 Marks

The Committee of Mr. Henry, Mr, Pandu and Mr. Dooku and Mr. Kartik having 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 8-

The Software Development Life Cycle (SDLC) provides a structured approach to software development. Various methodologies within SDLC—Sequential, Iterative, Evolutionary, and Agile—have their unique benefits and trade-offs. Below is a detailed explanation of these methodologies.

Sequential Methodology: This methodology (commonly known as the Waterfall model) follows a linear and sequential approach. Each phase (Requirement Gathering, Design, Development, Testing, Deployment) is completed before moving to the next phase. Not ideal, as the project involves multiple stakeholders (farmers, manufacturers) with evolving requirements and feedback, which require flexibility.

Iterative Methodology :This approach breaks the project into smaller iterations. Each iteration goes through the SDLC phases, refining the product progressively. A good choice, as it allows the team to deliver a working platform early and incorporate feedback from farmers and manufacturers in later iterations.

Evolutionary Methodology: This methodology builds the system incrementally over time, delivering functional components in stages. It is focused on developing a prototype quickly and refining it through feedback. A suitable choice if the team prioritizes building a functional prototype to gather feedback from farmers and manufacturers. However, care must be taken to ensure scalability and full functionality.

4. **Agile Methodology**: Agile is a highly flexible methodology that divides the project into small, manageable increments called **sprints** (typically 2–4 weeks). Each sprint delivers a working product and incorporates stakeholder feedback. **Recommended**, as the project involves multiple stakeholders with evolving needs (e.g., farmers' digital literacy, manufacturers' product updates). Agile ensures continuous improvement and timely delivery of value to users.

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 model.

Answer 9-

Different SDLC models provide varied approaches to project development. Here's an overview of the Waterfall**,** RUP (Rational Unified Process)**,** Spiral, and Scrum models, with an analysis of their suitability for this project.

1. Waterfall Model

The Waterfall model is a linear and sequential approach where each phase must be completed before the next begins. The phases include:

- Requirement Analysis
- System Design
- Implementation
- Testing
- Deployment
- Maintenance

Not Ideal for this project due to evolving requirements (e.g., usability feedback from farmers and updates from manufacturers). The rigid structure could delay delivering value to stakeholders.

2. RUP (Rational Unified Process)

RUP is an iterative development methodology that divides the project into four phases:

- **Inception**: Identify stakeholders and high-level requirements.
- **Elaboration**: Define architecture and address high-risk areas.
- **Construction**: Develop the system iteratively.
- **Transition**: Deploy the system and address user feedback.

Moderately Suitable, as it allows iterative development while emphasizing risk management. However, it may require a more experienced team to manage its complexity effectively.

3. Spiral Model

The Spiral model combines iterative development with risk management. It progresses through four quadrants repeatedly:

- Identify objectives and alternatives.
- Evaluate and mitigate risks.
- Develop and verify deliverables in increments.

- Plan the next iteration.

Suitable, as the project involves multiple risks (e.g., usability, technical feasibility, logistics). However, it may stretch the budget and timeline beyond the 2 Crore INR and 18-month constraints.

4. Scrum (Agile Framework)

Scrum is an Agile framework focused on iterative and incremental development through Sprints (time-boxed iterations of 2–4 weeks). Key elements include:

- **Product Owner**: Represents stakeholders, prioritizes the backlog.
- **Scrum Master**: Facilitates the team and removes impediments.
- **Development Team**: Builds the product.
- **Regular events**: Sprint Planning, Daily Stand-ups, Sprint Reviews, and Retrospectives

Recommended, as the project involves multiple stakeholders (farmers, manufacturers) and evolving requirements. Scrum allows for incremental delivery, stakeholder involvement, and continuous feedback, aligning perfectly with the project's dynamic nature.

Question 10 – Waterfall Vs V-Model - 5 Marks

Write down the differences between waterfall model and V model.

Differences Between Waterfall Model and V-Model

Aspect	Waterfall Model	V-Model
1. Approach	Linear and sequential; each phase must be completed before moving to the next.	Validation and verification phases occur simultaneously (test design happens in parallel with development).
2. Testing	Testing begins only after the development phase is complete.	Testing is planned and performed at every stage of development.
3. Feedback Loop	Feedback is gathered late in the process, often during testing or post-deployment.	Feedback is integrated early due to the parallel testing process.
4. Risk Management	High risk of defects being identified late in the lifecycle.	Lower risk as issues are identified early through continuous testing.
5. Documentation	Heavy documentation; each phase requires detailed documentation.	Documentation is also emphasized but focuses on test planning alongside development.
6. Changes to Requirements	Difficult to accommodate changes once a phase is complete.	Changes are still challenging but easier to incorporate since testing aligns with development stages.
7. Cost of Fixing Defects	High, as defects are identified late.	Lower, as defects are identified early in the lifecycle.
8. Suitability	Best for projects with well-defined, stable requirements.	Best for projects with strict quality requirements where early testing is critical.
9. Example for Agriculture Store Project	- Not ideal as the project involves evolving requirements from farmers and manufacturers. - Testing would occur too late to incorporate meaningful feedback.	- More suitable than Waterfall as early testing ensures usability for farmers and alignment with product goals. However, flexibility in evolving requirements may still be limited compared to Agile methodologies.

Question 11 – Justify your choice - 3 Marks

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

Answer 11-

The Waterfall Model is applied to the given scenario, the project would follow a sequential and structured approach with distinct phases. Below is how the scenario fits into the Waterfall Model:

1. Requirement Gathering and Analysis

- As a BA, I would interact with stakeholders, including Mr. Henry, Peter, Kevin, Ben, and manufacturing companies, to gather detailed requirements.
- Requirements such as user-friendly application design, the ability to display and buy products, and delivery tracking would be documented.
- Outputs include the Requirement Specification Document and a Stakeholder Register for tracking all involved parties.

2. System Design

- Based on the requirements, the technical team (led by Ms. Juhi and Mr. Vandanam)
- Outputs include high-level and detailed design documents.

3. Implementation (Coding and Development)

- Development tasks are divided among the Java developers (Ms. Juhi, Mr. Teyson, Ms. Lucie, Mr. Tucker, and Mr. Bravo).
- Features are coded sequentially, starting with core functionalities like product listing, browsing, and ordering.
- Mr. Mike ensures the network infrastructure supports the application.
- Deliverables include fully developed modules for fertilizers, seeds, pesticides, payment, and delivery systems.

4. Integration and Testing

- After all modules are coded, they are integrated into a single system.
- Testers (Mr. Jason and Ms. Alekya) validate the system for functionality, usability, performance, and security.
- Deliverables include test cases, bug reports, and a tested product ready for deployment.

5. Deployment

- The application is deployed on servers or cloud platforms.
- Farmers in remote areas are trained to use the system through user manuals or video guides.
- Initial rollout happens in pilot locations, followed by a broader launch.

6. Maintenance

- Post-deployment, the application is monitored for any issues.
- APT IT Solutions provides ongoing support for bug fixes and minor enhancements.
- Feedback from farmers and manufacturers is addressed to improve the system.

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 the Resources are PM, BA, Java Developers, testers, DB Admin, NW Admin.

Answer 12-

Gantt Chart Structure

Below is an outline of how the timeline might look. A typical Gantt chart will have phases on the vertical axis and time (in weeks/months) on the horizontal axis.

Phase	JAN-MAR	APR-JUN	JUL-SEPT	OCT-DEC	JAN-MAR	APR-JUN
Requirement Gathering (RG)						
Requirement Analysis (RA)						
D1						
T1						
D2						
T2						
D3						
T3						
D4						
T4						
USER ACCEPTENCE						

Question 13 – Fixed Bid Vs Billing - 5 Marks

Explain the difference between Fixed Bid and Billing projects.

Answer 13

Aspect	Fixed Bid Projects	Billing (Time & Material) Projects
Definition	A project where the total cost and timeline are agreed upon upfront and remain fixed.	A project where costs are based on the actual time and resources spent.
Budget	Predetermined (e.g., **₹2 Crores** for this project).	Variable; depends on hours worked and resources utilized.
Scope Flexibility	Limited; scope must be defined and frozen early.	High; scope can evolve as the project progresses.
Risk	Vendor (APT IT Solutions) assumes the risk of exceeding budget or timeline.	Client (SOONY) assumes the risk of potential cost overruns due to scope changes.
Timeline Management	Strict; delays may incur penalties for the vendor.	Flexible; timelines may adjust based on evolving requirements.
Quality Assurance	Vendor ensures quality to meet agreed deliverables within constraints.	Quality depends on continuous collaboration and monitoring.
Client Involvement	Minimal after the requirements phase; client focuses on final deliverables.	High; the client is actively involved throughout the project lifecycle.
Applicability to Scenario	Suitable if the scope is well-defined (e.g., RG, RA, and Design phases are finalized).	Suitable if the scope is dynamic and stakeholder needs evolve over time.
Example in the Scenario	Fixed Bid: Delivering the application within 18 months and ₹2 Crores as agreed by SOONY and APT IT Solutions.	Time & Material: Adjusting features like adding multi-language support or logistics tracking based on feedback, charging based on time/resources spent.

1. **Fixed Bid**:
    - Best suited if the project scope, timeline, and budget are clearly defined during the Requirement Gathering (RG) and Requirement Analysis (RA) phases.
    - Risk is higher for APT IT Solutions if unforeseen complexities arise.
2. **Billing**:
    - Ideal for this project since evolving requirements (e.g., farmer feedback, manufacturer updates) are likely.

- Allows flexibility in accommodating changes but may exceed the initial ₹2 Crore budget if not managed effectively.

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

Answer 14-

Timesheets of a Business Analyst (BA) in Various SDLC Stages

For the Online Agriculture Store Project, the BA's responsibilities revolve around managing stakeholder requirements, ensuring clarity for developers, and aligning deliverables with business objectives. Below are detailed timesheets for the BA in each SDLC phase.

1. Design Timesheet of a BA

Task	Hours Allocated
Refining business and functional requirements with stakeholders (Mr. Henry, Mr. Pandu, Mr. Dooku)	2 hours
Preparing use cases, user stories, and requirement specifications	3 hours
Collaborating with the design team to review UI/UX drafts	1 hour
Conducting design review meetings with stakeholders and team	1 hour
Updating and finalizing design documents	1 hour

Total Hours: 8

2. Development Timesheet of a BA

Task	Hours Allocated
Providing requirement clarifications to developers	3 hours
Conducting walkthroughs of requirements and design documents with the development team (Ms. Juhi, Mr. Teyson, etc.)	2 hours
Monitoring development progress and addressing queries	2 hours
Documenting and managing change requests (e.g., additional features like logistics tracking)	1 hour

Total Hours: 8

3. Testing Timesheet of a BA

Task	Hours Allocated
Reviewing test cases prepared by testers (Mr. Jason and Ms. Alekya) to ensure alignment with requirements	2 hours
Assisting testers with understanding user scenarios and edge cases	2 hours
Participating in defect triage meetings with testers and developers	2 hours
Reviewing test execution results and ensuring traceability with requirements	1 hour
Updating the requirement traceability matrix (RTM) based on feedback	1 hour

Total Hours: 8

4. UAT (User Acceptance Testing) Timesheet of a BA

Task	Hours Allocated
Coordinating UAT sessions with stakeholders (Peter, Kevin, and Ben)	2 hours
Preparing UAT scenarios and assisting stakeholders during testing	2 hours
Documenting feedback and identifying gaps	2 hours
Ensuring issues identified in UAT are addressed by the development team	1 hour
Preparing UAT completion report and obtaining stakeholder sign-offs	1 hour

Total Hours: 8

5. Deployment and Implementation Timesheet of a BA

Task	Hours Allocated
Supporting pre-deployment validations and readiness checks	2 hours
Conducting training sessions for farmers and manufacturers on using the platform	2 hours
Monitoring deployment activities to ensure requirements are implemented correctly	2 hours
Assisting stakeholders in verifying post-deployment functionality	1 hour
Preparing final documentation and deployment summary	1 hour

Total Hours: 8