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| **Course: Agile Software Engineering and DevOps** | | **Course Code: CS2004** | **Semester: IV** |
| **Time: 9:30am to 11am** | **Duration: 90 minutes** | **Date: March 14, 2025** | **Max Marks: 25** |

**Notes/ Instructions:**

1. **Answer all questions**

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| **Sl. No.** | **PART A – (MCQs) Max Marks (5)** | **Marks** | **L1-L6** | **CO** |
|  | A Scrum team completes five user stories in a sprint. However, only three meet the Definition of Done. Apply your understanding of Increment in Scrum to determine what should be included in the sprint’s Increment.  A. Only the three completed user stories  B. All five user stories since work was attempted  C. The Product Owner decides what to include  D. The unfinished stories should be marked as Done  **Answer:** A) Only the three completed user stories  Reason: Only stories that meet the Definition of Done (DoD) are included in the Increment | 1 | L3 | CO2 |
|  | Apply DevOps principles to determine its primary goal in modern software development.  A. Improve hardware performance  B. Automate and streamline the application lifecycle  C. Shift all responsibilities from development to operations teams  D. Minimize the need for testing  **Answer:** B) Automate and streamline the application lifecycle  Reason: DevOps focuses on automation, CI/CD, and collaboration to improve software delivery | 1 | L3 | CO4 |
|  | A Scrum team's burndown chart shows a sudden steep drop in the last two days of the sprint. Apply your understanding to determine what this indicates  A. The team completed most of their work at the last minute  B. The team maintained steady progress throughout the sprint  C. The sprint goal was reduced, removing some tasks  D. The burndown chart is incorrect and should be ignored  **Answer:** A) The team completed most of their work at the last minute  Reason: A steep drop in the burndown chart near the sprint’s end indicates work was completed late rather than steadily | 1 | L2 | CO2 |
| 4. | Which of the following best describes what velocity measures in Agile Scrum?  A. The speed at which team members type code  B. The amount of work a team can complete in a sprint  C. The number of meetings held during a sprint  D. The complexity of user stories  **Answer:** B) The amount of work a team can complete in a sprint  Reason: Velocity measures story points completed per sprint, helping teams plan future workloads | 1 | L2 | CO2 |
| 5. | Identify key advantage of requirements traceability in software development?  A. Testing is no longer required  B. All code bugs are automatically fixed  C. Ensures all requirements are met and tested  D. Cuts the project timeline by 50%  **Answer:** C) Ensures all requirements are met and tested  Reason: Requirements traceability ensures coverage from requirement gathering to testing | 1 | L2 | CO3 |

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| **Sl. No.** | **PART B – Max Marks (20)** | **Marks** | **L1-L6** | **CO** |
| **6.** | **a.** A product owner requests the release of an Increment before all backlog items are completed. Apply your knowledge of Scrum to determine if this is acceptable and explain why **(2 Marks)**  **Answer:**  a) Releasing an Increment before all backlog items are complete  Yes, it is acceptable as long as the Definition of Done (DoD) is met for the completed work. Unfinished backlog items move to future sprints  **b.** A software development team is working on a mobile banking application. How can they effectively structure their backlog using Epics, Features, and User Stories to ensure better project management and delivery **(3 Marks)**  **Answer:**  b) Structuring backlog with Epics, Features, and User Stories  Epic: "Mobile Banking System" (broad objective).  Feature: "User Authentication" (specific functionality).  User Stories: "As a user, I want to reset my password to regain account access." | 5 | L3 | CO2 |
| **7.** | **a.** Write a sequence of Git commands to create a new repository, add files, commit changes, and push them to a remote repository **(3 Marks)**  **Answer:**  git init  git add .  git commit -m "Initial commit"  git branch -M main  git remote add origin <repository\_url>  git push -u origin main  **b.** A development team faces issues with applications running differently on various environments due to dependency conflicts. Apply your understanding of Docker to explain how it can solve this problem and ensure consistent deployment **(2 Marks)**  **Answer:**  b) How Docker solves dependency conflicts  Docker containerizes applications, bundling dependencies so they run the same way on any environment. This eliminates "Works on my machine" issues. | 5 | L3 | CO4 |
| **8.** | Consider a scenario where you have the following tasks:   |  |  |  | | --- | --- | --- | | Task | Cost of Delay | Duration | | A | 72 | 12 | | B | 160 | 40 | | C | 75 | 15 |  1. Explain Weighted Shortest Job First (WSJF) **(1 Marks)**   **Answer:**  a) Explanation of WSJF - Formula: WSJF = Cost of Delay / Duration  Helps prioritize tasks that deliver the most value quickly   1. Compute the WSJF score and rank the tasks **(2 Marks)**   **Answer:**  The WSJF (Weighted Shortest Job First) formula is used to prioritize tasks by dividing the Cost of Delay (CoD) by Duration. Applying this formula, we calculate WSJF scores as follows:  Task A = 6.0 (72/12), Task C = 5.0 (75/15), and Task B = 4.0 (160/40). A higher WSJF score means the task should be prioritized first. Based on this, Task A is the highest priority, followed by Task C, and Task B is the lowest priority.  This ranking ensures that the most valuable work is completed in the shortest possible time. Task A is prioritized first as it delivers high value quickly, Task C follows due to a strong WSJF score, and Task B, despite its high Cost of Delay, takes too long to be the top priority. This approach optimizes value delivery in SAFe Agile planning.   1. Your organization is adopting SAFe, and the leadership wants to ensure smooth execution of multiple Agile teams. Apply your understanding of Program Increment (PI) to explain how it helps in aligning teams, planning work, and delivering value effectively **(2 Mark)**   **Answer:**  c) Role of Program Increment (PI) in SAFe   * Aligns multiple Agile teams * Provides a time-boxed period (8–12 weeks) for planning & execution * Ensures incremental delivery of value through iterations | 5 | L3 | CO2 |
| **9.** | 1. Compare Regression Testing and Acceptance Testing **(3 Marks)**   **Answer:**  **a) Regression Testing vs. Acceptance Testing**   * **Regression Testing:** Ensures existing features work after changes * **Acceptance Testing:** Validates if software meets business requirements before release  1. Explain Security Testing and its significance, Give Example **(2 Marks)**   **Answer:**  Security Testing Identifies vulnerabilities in applications  Example: Penetration Testing to check for SQL injection risks | 5 | L3 | CO3 |

Course Outcomes

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| CO 1 | Evaluate the advantages and disadvantages of Agile development compared to traditional models |
| CO 2 | Assess various Agile methodologies such as Scrum, XP, Lean, and Kanban, and determine their appropriate applications |
| CO 3 | Create software requirements, design specifications, test plan and Analyze test coverage, requirements traceability for a software project |
| CO 4 | Utilize and implement various DevOps tools (e.g., Git, GitHub, Docker) in a software project |
| CO 5 | Develop a mini software project using Agile Scrum methodology, simulating its roles, meetings, processes, and artifacts |

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| **Marks Distribution** | | | | | | | | | |
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