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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 06 / 01/ 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOIS | **Program:** MCA | |
| **Course Code :**CSA4015 | **Course Name :** DEVOPS AND MICROSERVICES | |
| **Semester**: III | **Max Marks**:100 | **Weightage**:50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **24** | **24** | **28** | **24** | **NA** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Mention any **two benefits** of adopting DevOps practices. | **2 Marks** | **L1** | **CO1** |
| **2** | Define Continuous Integration and Continuous Deployment in DevOps. | **2 Marks** | **L1** | **CO1** |
| **3** | Outline **three popular CI/CD tools** used in DevOps. | **2 Marks** | **L1** | **CO2** |
| **4** | Illustrate containerization with respect to Dockers usages? | **2 Marks** | **L1** | **CO2** |
| **5** | Explain **inter-service communication** in microservices? | **2 Marks** | **L1** | **CO3** |
| **6** | Summarize **service discovery** and its importance in microservices architecture. | **2 Marks** | **L1** | **CO3** |
| **7** | Relate **gRPC** with inter-service communication? | **2 Marks** | **L1** | **CO3** |
| **8** | Explain the role of **Kafka** in event-driven microservices. | **2 Marks** | **L1** | **CO3** |
| **9** | Identify the reasons for “critical logg**ing**” in microservices architecture. | **2 Marks** | **L1** | **CO4** |
| **10** | Identify challenges arise when **sharing data** between microservices. | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | a.  b. | **What are the stages in DevOps lifecycle** ? Draw with a diagram. Define the principles of DevOps with suitable examples.  Relate a case study for Student management system with DevOps Integration for designing and developing this application. | **[10+10] Marks** | **L2** | **CO1** |
| **or** | | | | | |
| **12.** | a.  b. | Define **Continuous Integration, Continuous Deployment, and Continuous Testing** in DevOps. Highlight how they improve software delivery.  Relate a case study for Retail management system and with DevOps Integration for designing and developing this application. | **[10+10] Marks** | **L2** | **CO1** |
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| **13.** | a.  b. | Explain **Microservices Architecture**. Compare it with Monolithic Architecture, including at least 3 differences with examples.  Explain their importance in Microservice practices with a case study of a company transitioning monolithic to microservices to improve software delivery. Discuss the challenges faced and the benefits achieved. | **[10+10] Marks** | **L2** | **CO2** |
| **or** | | | | | |
| **14.** | a.  b. | Explain the key characteristics of microservices architecture and why is it suitable for modern application development.  Use the example of an online shopping application to describe how microservices can be used to manage different functionalities such as Product catalog, User Management, Order Processing and Payment Services. Include a diagram to illustrate the microservices architecture of the online shopping application. | **[10+10] Marks** | **L2** | **CO2** |

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| **15.** | a.  b.  c. | Apply ELK stack to monitor and visualize login attempts in a microservices-based application.  Identify details of logs are ingested, processed, and stored.  Describe the role of each component (Elasticsearch, Logstash, Kibana) in the context of LoginService. | **[7+7+6] Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16.** | a.  b.  c. | Organize the steps to create a Kibana dashboard for monitoring login attempts from LoginService.  Identify details of visualizations like log tables, bar graphs, and pie charts.  Explain the field like status, timestamp, and location can be used for meaningful sights. | **[7+7+6] Marks** | **L2** | **CO3** |

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| **17.** | a.  b. | Analyze the 12-Factor App principles.  Examine how these principles improve microservices-based application development with a case study of a company migrating its monolithic online shopping application to a microservices architecture. Inspect the 12-Factor principles enhanced scalability, maintainability, and deployment efficiency. | **[10+10] Marks** | **L2** | **CO4** |
| **Or** | | | | | |
| **18.** | a.  b. | **Case Study:** "ShopSmart," an online shopping app, has various microservices like **Order Service**, **Payment Service**, **Inventory Service**, and **Notification Service**. The team faces challenges in enabling seamless communication and integration among these services, especially for order confirmation workflows.  Questions:  Discover a **Decomposition Design Pattern** for **Order Service** to ensure it is well-organized and easily maintainable. Explain whether **Decomposition by Business Capability** or **Decomposition by Subdomain** would be more suitable for this service.  Analyze a suitable **Database Pattern** for ensuring transaction consistency in payment processing across microservices. How can the **Saga Pattern** or **Eventual Consistency** be applied? | **[10+10] Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***