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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS6PESOA **Max Marks: 100**
Course: Service Oriented Architecture

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		Define a service, service interface and statelessness in a service	*CO1*		**5**
	b)		What are the primary challenges involved in developing a cloud-based ride-hailing application?	*CO2*	*PO1*	**5**
	c)		How can the principles of Service-Oriented Architecture (SOA) be applied to design a food delivery system that supports ordering and integrates with QR-code based FinTech payment application?	*CO3*	*PO2*	**10**
			OR			
2	a)		Explain core components of SOA and how do these components interact to provide a scalable service architecture?	*CO1*		**5**
	b)		Define Service-Oriented Architecture (SOA). Explain any two key characteristics of SOA with examples.	*CO2*	*PO1*	**5**
	c)		Discuss the key challenges in building large-scale modern applications. Support your answer with real-world examples such as TV Streaming application.	*CO3*	*PO2*	**10**
			UNIT - II			
3	a)		What is the Circuit Breaker Pattern? Illustrate with an example how it prevents cascading failures in SOA-based systems.	*CO2*	*PO1*	**5**
	b)		What is the difference between a forward proxy and a reverse proxy and in what scenarios would a forward proxy be used in a SOA environment?	*CO1*		**5**
	c)		Compare REST and GraphQL in the context of data access in SOA Highlight their pros and cons.	*CO2*	*PO1*	**10**
			OR			
4	a)		What are ACID properties in databases? Given an example of SQL data base usage	*CO1*		**5**

		b)	Explain Domain Name Service and how it helps in service communication.	*CO1*		**5**
		c)	Consider you are building a News Aggregation app, where users want different kinds of data (e.g some want headlines, some want full articles or some want just images). Choose one approach of GraphQL or REST API, explain and justify: (a) How it impacts data efficiency (avoiding over-fetching or under-fetching). (b) How the chosen API approach handles data flexibility	*CO3*	*PO2*	**10**
			UNIT - III			
	5	a)	What is the role of containerization in SOA? Mention key tools used.	*CO1*		**5**
		b)	How does API Governance and API design principles help in managing service-oriented systems?	*CO2*	*PO1*	**5**
		c)	In the design of a QR-code based payment service, explain Event Sourcing and how Event Driven Messaging System enables seamless function between systems	*CO3*	*PO2*	**10**
			OR			
	6	a)	What is Event Sourcing in SOA? How does it differ from traditional state storage? Mention one real-world use case	*CO1*		**5**
		b)	What is Kubernetes and its core functions in context of SOA	*CO2*	*PO1*	**5**
		c)	What is Containerization and Docker Containers. Given three applications, App-A, App-B and App-C, illustrate how each of these Apps are deployed in containers on host operating system.	*CO3*	*PO1*	**10**
			UNIT - IV			
	7	a)	What are threat models in SOA? List and briefly explain any two common threat scenarios in a service-oriented system.	*CO2*	*PO1*	**5**
		b)	Explain any two key security risks associated with SOA-based microservices and mention one mitigation strategy for each.	*CO1*		**5**
		c)	What is the risk of Denial-of-Service (DoS) Attacks and how to address it and What are risks of Insecure Communication and how to address it.	*CO3*	*PO2*	**10**
			OR			
	8	a)	Why is it risky to integrate new services with legacy systems and how to mitigate those risks.	*CO1*		**5**
		b)	What is the risk of Insufficient Logging and Monitoring and how to address it.	*CO2*	*PO1*	**5**
		c)	A Travel Booking system uses SOA to integrate services for storing Employee Personal details and Performance data. Explain how Explain any three security risks associated and any two security principles can be applied to protect sensitive employee information and prevention methods.	*CO3*	*PO2*	**10**

			UNIT - V			
	9	a)	How does FaaS improve scalability and cost-efficiency in SOA-based systems?	***CO1***		**5**
		b)	Explain how SOA can integrate NLP to provide better service user experience	***CO2***	***PO1***	**5**
		c)	How are AI and ML models integrated into SOA-based architectures? Mention any two benefits and one challenge	***CO2***	***PO1***	**10**
			OR			
	10	a)	Describe any two operational characteristics of Serverless Computing and one challenge	***CO2***	***PO1***	**5**
		b)	Mention any two features of Serverless functions and one example of a serverless function	***CO2***	***PO1***	**5**
		c)	What are intelligent agents in the context of SOA? Provide two example applications that benefit from intelligent agent-based services.	***CO2***	***PO1***	**10**

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