U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Electronics and Communication Engineering **Duration: 3 hrs.**

Course Code: 22EC8PE4DS **Max Marks: 100**

Course: Database Security and Access Control

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)	Name two common mechanisms used to implement access control.	*2*	*1*	**5**
	b)	Briefly describe the difference between a policy, a model, and a mechanism in the context of access control.	*3*	*2*	**5**
	c)	Assess the significance of the "need-to-know" policy in minimizing potential security breaches.	*3*	*2*	**10**
		OR			
2	a)	Give the need and goals of access control	*2*	*1*	**5**
	b)	Summarize the core principle behind Non-Discretionary Access Control.	*3*	*2*	**5**
	c)	Propose a hybrid access control system that combines elements of DAC and MAC to address specific security and usability requirements in a collaborative project.	*3*	*2*	**10**
		UNIT - II			
3	a)	Name the four core components of the Core RBAC model. Mention any one limitation of the RBAC model?	*3*	*2*	**5**
	b)	Explain the purpose of statically constrained RBAC. Provide an example of a constraint.	3	2	**5**
	c)	Evaluate the claim that RBAC provides a better balance between security and ease of management compared to DAC and MAC. Justify your position.	3	2	**10**
		OR			

	4	a)	Describe a situation where a dynamically constrained RBAC rule could be useful, such as limiting access based on the time of day or the user's location.	*3*	*2*	**5**
		b)	Examine the situations where the inherent structure of RBAC might not be flexible enough to meet all organizational access control needs.	*3*	*2*	**5**
		c)	Propose a set of static constraints that could be implemented in an RBAC system for a financial institution to prevent conflicts of interest.	*3*	*2*	**10**
			UNIT - III			
	5	a)	Explain the difference between "general inheritance" and "limited inheritance" in Role Hierarchies.	*3*	*2*	**5**
		b)	Describe the role of Constrained Data Items (CDIs) and Transformation Procedures (TPs) in the Clark-Wilson Model.	*3*	*2*	**5**
		c)	In a financial transaction system, how could the Clark-Wilson Model's TPs and CDIs be used to ensure the integrity of financial records?	*2*	*1*	**10**
			OR			
	6	a)	Explain how Biba's Integrity Model differs from confidentiality-focused models like Bell-LaPadula.	*3*	*2*	**5**
		b)	Describe how Separation of Duty can help prevent fraud and errors in a system.	*3*	*2*	**5**
		c)	Analyze the challenges and benefits of mapping a complex enterprise organizational structure onto a system's access control framework	*2*	*1*	**10**
			UNIT - IV			
	7	a)	Name the five phases of a smart card life cycle	*1*	--	**5**
		b)	Describe the process of file management within a smart card.	*2*	*1*	**5**
		c)	Illustrate the sequence of steps involved in the ATR process when a smart card is inserted into a reader	*2*	*1*	**10**
			OR			
	8	a)	Imagine a smart card nearing the end of its active life cycle. What steps would need to be taken in the subsequent phases?	*1*	--	**5**
		b)	If you were designing a smart card for a secure payment system, which type of memory organization would you prioritize and why?	*2*	*1*	**5**

		c)	Compare and contrast the different memory organization techniques used in smart cards in terms of security, cost, and performance.	*2*	*1*	**10**
			UNIT - V			
	9	a)	What is the primary function of a Cloud Access Security Broker (CASB) in the context of cloud database security?	*2*	*1*	**5**
		b)	Summarize the core idea behind the Zero Trust architecture and its implications for database security.	*3*	*2*	**5**
		c)	Given a scenario where a company is migrating its on-premises database to the cloud, what are two specific security challenges they might face and how could they address them?	*3*	*2*	**10**
			OR			
	10	a)	Describe the principle of "least privilege" and how RBAC helps to enforce it.	*2*	*1*	**5**
		b)	Suppose a database administrator discovers a database with default login credentials. Outline the immediate steps they should take to mitigate the security risk.	*3*	*2*	**5**
		c)	Evaluate the effectiveness of encryption as a security measure against different types of database vulnerabilities.	*3*	*2*	**10**

****