Reg. No.															

Question Paper Code	13842

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Artificial Intelligence and Data Science

20AIEL708 - DATABASE SECURITY AND AUDITING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following is NOT a security problem in databases? (a) Unauthorized access (b) Data redundancy (c) Inference attacks (d) Data corruption	1	K1	CO1
2.	Bussolati and Martella's model is designed for: (a) Distributed databases (b) Statistical databases (c) Active databases (d) Frame-based systems	1	K1	CO1
3.	The Take-Grant model is primarily used for: (a) Statistical database protection (b) Flow control in databases (c) Object-oriented database security (d) Distributed database security	1	K1	CO2
4.	Dion's model is primarily used for: (a) Statistical database protection (b) Flow control in databases (c) Secure operating system design (d) Object-oriented database security	1	K1	CO2
5.	Memory protection is primarily concerned with: (a) Preventing unauthorized access to memory (b) Improving memory speed (c) Reducing memory usage (d) Allocating memory efficiently	1	K1	CO3
6.	Control flow mechanisms are used to: (a) Regulate the flow of data between processes (b) Improve database performance (c) Reduce storage costs (d) Simplify query processing	1	K1	CO3
7.	The methodological approach to security software design emphasizes: (a) Ad-hoc coding practices (b) Structured development processes (c) Rapid prototyping (d) Minimal documentation	1	K1	CO4
8.	The IDES system is an example of: (a) Secure operating system (b) Intrusion detection system (c) Database management system (d) Statistical analysis tool	1	K1	CO4
9.	Which is a key feature of the SORION Model for Object Oriented Databases? (a) SQL-based query language (b) Object encapsulation with access rights (c) Frame inheritance (d) Use of XML for storage	1	K1	CO5
10.	Which is NOT a feature of the Orion Model? (a) Fine-grained policy enforcement (b) Integration of triggers in the security framework (c) Direct hardware manipulation (d) Dynamic policy updates	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Outline how Take-Grant Model works.	2	K2	CO1
12.	What is meant by capability lists?	2	K1	CO1
13.	How does the Lattice Model enforce security?	2	K1	CO2
14.	Compare and contrast Biba and Bell-LaPadula models.	2	K2	CO2
15.	List out the control flow mechanisms that ensures security.	2	K2	CO3
16.	What is mandatory access control (MAC)?	2	K1	CO3

17.	Compare Role-Based Access Control (RBAC) with Access Control Lists (ACL) in terms of scalability and administrative overhead.	*2*	*K2*	*CO4*
18.	Evaluate the trade-offs between signature-based and anomaly-based intrusion detection methods in terms of false positive rates and zero-day attack detection.	*2*	*K2*	*CO4*
19.	What is the role of encapsulation in OO Database Security?	*2*	*K1*	*CO5*
20.	Explain the challenges of implementing mandatory access control (MAC) in frame-based systems with inheritance hierarchies.	*2*	*K2*	*CO5*
21.	Compare the security implications of implementing two-phase commit protocol versus three-phase commit protocol in distributed transaction management.	*2*	*K2*	*CO6*
22.	Define the Orion Model in database security.	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the model in which level of protection can be viewed as a matrix form.	*11*	*K2*	*CO1*
		OR			
	b)	Conduct a detailed case study on any domain, discussing the types of data typically handled, how the data is currently maintained, the existing security measures including detective, corrective, and preventive procedures, possible future enhancements to improve data security and management, and finally, evaluate how the integration of Block chain technology could impact and benefit the system.	*11*	*K2*	*CO1*
24.	a)	Compare Bell-LauPadula model and Biba model in detail.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the model which is well suited for the purpose of flow control.	*11*	*K2*	*CO2*
25.	a)	Make use of three security checkpoints they encounter from login attempt to accessing confidential files.	*11*	*K3*	*CO3*
		OR			
	b)	Experiment with different types of control flow mechanisms to observe their behaviour in a program.	*11*	*K3*	*CO3*
26.	a)	Apply various Intrusion Detection System types to resolve security challenges including unauthorized access, malware, and suspicious network activities.	*11*	*K3*	*CO4*
		OR			
	b)	Identify suitable secure DBMS design methodologies for education sector and demonstrate their implementation through practical examples addressing their specific security needs.	*11*	*K3*	*CO4*
27.	a)	Examine and critically evaluate comprehensive role-based security architecture for an active database system in a multi-national banking environment.	*11*	*K4*	*CO5*
		OR			
	b)	Analyse the SORION Model for OO Databases in detail, explaining how it assigns access rights and ensures object security.	*11*	*K4*	*CO5*
28.	a)	Apply Jajodia-Kogan's Model to design a secure active database system for a university management system.	*11*	*K3*	*CO6*
		OR			
	b)	Experiment the protection challenges faced in active databases and how they differ from traditional databases.	*11*	*K3*	*CO6*