

# **SRM VALLIAMMAI ENGINEERING COLLEGE**

**(An Autonomous Institution)**

SRM Nagar, Kattankulathur – 603 203

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**QUESTION BANK**



**V SEMESTER**

**PIT202 - STORAGE TECHNOLOGIES**

**Regulation – 2023**

**Academic Year 2024-2025 (ODD Semester)**

*Prepared by*

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## DEPARTMENT OF INFORMATION TECHNOLOGY

### QUESTION BANK

**SUBJECT : PIT202 - STORAGE TECHNOLOGIES**

**SEM / YEAR : V Sem / III Year**

UNIT I - STORAGE SYSTEMS			
<b>SYLLABUS:</b> Introduction to Information Storage: Digital data and its types, Information storage, Key characteristics of data center and Evolution of computing platforms. Information Lifecycle Management. Third Platform Technologies: Cloud computing and its essential characteristics, Cloud services and cloud deployment models, Big data analytics, Social networking and mobile computing. Characteristics of third platform infrastructure and Imperatives for third platform transformation. Data Center Environment: Building blocks of a data center, Compute systems and compute virtualization and Software defined data center.			
PART-A			
Q.No.	Question	Level	Competence
1	Define digital data.	BTL1	Remember
2	List the types of digital data.	BTL1	Remember
3	What is information storage?	BTL1	Remember
4	What are the functions of information storage?	BTL2	Understand
5	State any two key characteristics of a data center.	BTL1	Remember
6	What do you mean by data availability in data centers?	BTL2	Understand
7	Define scalability in the context of storage.	BTL1	Remember
8	What is Information Lifecycle Management (ILM)?	BTL1	Remember
9	List the key phases of ILM.	BTL1	Remember
10	Explain the purpose of ILM in data management.	BTL2	Understand
11	What are third platform technologies?	BTL1	Remember
12	Mention any two essential characteristics of cloud computing.	BTL1	Remember
13	What is elasticity in cloud computing?	BTL2	Understand
14	Define IaaS and PaaS.	BTL1	Remember
15	What is a cloud deployment model? Name any two.	BTL1	Remember
16	Differentiate between public cloud and private cloud.	BTL2	Understand
17	Define big data analytics.	BTL1	Remember
18	Mention two benefits of using big data analytics.	BTL2	Understand
19	What is the role of social networking in third platform?	BTL2	Understand
20	What is mobile computing?	BTL1	Remember
21	Define compute virtualization.	BTL1	Remember
22	What is meant by a software-defined data center (SDDC)?	BTL1	Remember

23	List the building blocks of a data center.	BTL1	Remember
24	Explain the significance of compute systems in a data center.	BTL2	Understand

### PART-B

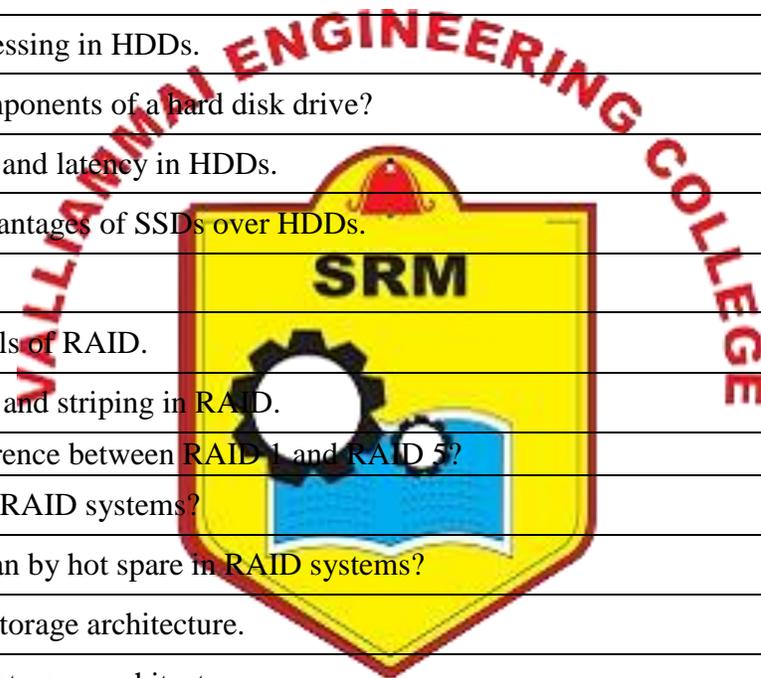
Q.No.	Question	Marks	Level	Competence
1	Explain in detail the <b>evolution of computing platforms</b> from mainframe to cloud.	16	BTL4	Analyze
2	Compare and contrast the <b>types of digital data</b> with suitable examples.	16	BTL4	Analyze
3	Apply the <b>information storage principles</b> to design a basic storage layout for a small enterprise.	16	BTL3	Apply
4	Analyze the <b>key characteristics of a modern data center</b> and how they impact data operations.	16	BTL5	Evaluate
5	Design an <b>information lifecycle management strategy</b> for a hospital information system.	16	BTL6	Create
6	Justify the <b>need for ILM</b> in large organizations with real-life use cases.	16	BTL5	Evaluate
7	Demonstrate how <b>cloud computing essential characteristics</b> provide operational benefits.	16	BTL3	Apply
8	Analyze different <b>cloud service models</b> and suggest an appropriate model for an e-learning platform.	16	BTL5	Evaluate
9	Recommend suitable <b>cloud deployment models</b> for a government and private bank. Justify your answer.	16	BTL6	Create
10	Examine the role of <b>big data analytics</b> in transforming decision-making processes.	16	BTL4	Analyze
11	Apply <b>social networking and mobile computing trends</b> in the context of enterprise communication.	16	BTL3	Apply
12	Discuss the <b>imperatives for third platform transformation</b> and how organizations can adapt.	16	BTL5	Evaluate
13	Analyze the <b>infrastructure components of third platform technologies</b> and their interactions.	16	BTL4	Analyze
14	Create a layout of a <b>software-defined data center</b> and explain how it differs from traditional data centers.	16	BTL6	Create
15	Apply the concept of <b>compute virtualization</b> in optimizing data center performance.	16	BTL3	Apply
16	Evaluate the <b>advantages and limitations of software-defined data centers (SDDC)</b> .	16	BTL5	Evaluate
17	Design a <b>cloud-based solution</b> for a startup using third platform technologies.	16	BTL6	Create

## UNIT II - INTELLIGENT STORAGE SYSTEMS AND RAID

**SYLLABUS:** Components of an intelligent storage system, Components, addressing, and performance of hard disk drives and solid-state drives, RAID, Types of intelligent storage systems, Scale-up and scale out storage Architecture.

### PART-A

Q.No.	Question	Level	Competence
1	What is an intelligent storage system?	BTL1	Remember
2	List any two components of an intelligent storage system.	BTL1	Remember
3	Define front-end and back-end in a storage system.	BTL1	Remember
4	What is the function of cache in a storage system?	BTL2	Understand
5	List two differences between SSD and HDD.	BTL2	Understand
6	Define data addressing in HDDs.	BTL1	Remember
7	What are the components of a hard disk drive?	BTL1	Remember
8	Define seek time and latency in HDDs.	BTL1	Remember
9	Mention two advantages of SSDs over HDDs.	BTL2	Understand
10	What is RAID?	BTL1	Remember
11	List any two levels of RAID.	BTL1	Remember
12	Define mirroring and striping in RAID.	BTL2	Understand
13	What is the difference between RAID 1 and RAID 5?	BTL2	Understand
14	What is parity in RAID systems?	BTL2	Understand
15	What do you mean by hot spare in RAID systems?	BTL1	Remember
16	Define scale-up storage architecture.	BTL1	Remember
17	Define scale-out storage architecture.	BTL1	Remember
18	State one key difference between scale-up and scale-out architecture.	BTL2	Understand
19	What is a high-end intelligent storage system?	BTL1	Remember
20	Name any two types of intelligent storage systems.	BTL1	Remember
21	Explain midrange storage system in brief.	BTL2	Understand
22	What is entry-level storage system?	BTL1	Remember
23	Mention two key performance parameters of SSDs.	BTL1	Remember
24	How does caching improve storage system performance?	BTL2	Understand



## PART-B

Q.No.	Question	Marks	Level	Competence
1	Explain the architecture and components of an intelligent storage system with a neat diagram.	16	BTL4	Analyze
2	Compare the internal architecture and performance of HDDs and SSDs.	16	BTL4	Analyze
3	Apply the concept of RAID to design a fault-tolerant storage system for a mid-sized company. Justify your selection of RAID levels.	16	BTL3	Apply
4	Evaluate different RAID levels in terms of data protection, performance, and cost.	16	BTL5	Evaluate
5	Design a RAID-based storage solution that balances performance and reliability for a financial institution.	16	BTL6	Create
6	Analyze the impact of caching in improving I/O performance in intelligent storage systems.	16	BTL5	Evaluate
7	Compare and contrast scale-up and scale-out storage architectures. Provide use cases for each.	16	BTL4	Analyze
8	Create a scalable storage architecture for a cloud service provider using scale-out design principles.	16	BTL6	Create
9	Apply performance tuning techniques to optimize storage I/O in enterprise systems using intelligent storage.	16	BTL3	Apply
10	Discuss the role of front-end and back-end components in intelligent storage systems with suitable examples.	16	BTL4	Analyze
11	Evaluate the benefits and limitations of mid-range and high-end intelligent storage systems.	16	BTL5	Evaluate
12	Propose a cost-effective entry-level storage system for a startup company.	16	BTL6	Create
13	Apply SSD technology in environments requiring high-speed read/write operations.	16	BTL3	Apply
14	Discuss how RAID 6 provides high fault tolerance. Compare it with RAID 10.	16	BTL4	Analyze
15	Design a hybrid storage system using both HDDs and SSDs to optimize cost and performance.	16	BTL6	Create
16	Examine how intelligent storage systems contribute to overall data center efficiency.	16	BTL4	Analyze
17	Propose a RAID configuration for a video surveillance system requiring high write speed and fault tolerance.	16	BTL6	Create

### UNIT III - STORAGE NETWORKING TECHNOLOGIES AND VIRTUALIZATION

**SYLLABUS:** Block-Based Storage System, File-Based Storage System, Object-Based and Unified Storage. Fibre Channel SAN: Software-defined networking, FC SAN components and architecture, FC SAN topologies, link aggregation, and zoning, Virtualization in FC SAN environment. Internet Protocol SAN: iSCSI protocol, network components, and connectivity, Link aggregation, switch aggregation, and VLAN, FCIP protocol, connectivity, and configuration. Fibre Channel over Ethernet SAN: Components of FCoE SAN, FCoE SAN connectivity, Converged Enhanced Ethernet, FCoE architecture.

#### PART-A

Q.No.	Question	Level	Competence
1	Define block-based storage.	BTL1	Remember
2	What is file-based storage?	BTL1	Remember
3	Mention one advantage of object-based storage.	BTL2	Analyze
4	What is unified storage?	BTL1	Remember
5	Differentiate between file-based and block-based storage.	BTL2	Analyze
6	Define SAN (Storage Area Network).	BTL1	Remember
7	List any two components of a Fibre Channel SAN.	BTL1	Remember
8	What is zoning in a SAN environment?	BTL2	Analyze
9	Define software-defined networking (SDN).	BTL1	Remember
10	Mention any two FC SAN topologies.	BTL1	Remember
11	What is link aggregation in SANs?	BTL2	Analyze
12	Define virtualization in FC SAN.	BTL1	Remember
13	What is the function of an HBA (Host Bus Adapter)?	BTL1	Remember
14	State any two benefits of using FC SAN.	BTL2	Analyze
15	What is iSCSI?	BTL1	Remember
16	Mention two components required for iSCSI storage.	BTL1	Remember
17	Define VLAN.	BTL1	Remember
18	What is FCIP used for?	BTL2	Analyze
19	Differentiate between iSCSI and FCIP.	BTL2	Analyze
20	Define Fibre Channel over Ethernet (FCoE).	BTL1	Remember
21	What is Converged Enhanced Ethernet (CEE)?	BTL2	Analyze
22	List any two components of FCoE SAN.	BTL1	Remember
23	State a key benefit of using unified storage architecture.	BTL2	Analyze
24	What is switch aggregation?	BTL2	Analyze

#### PART-B

Q.No.	Question	Marks	Level	Competence
1	Compare block-based, file-based, and object-based storage systems. Suggest scenarios where each is best used.	16	BTL4	Analyze

2	Apply the concept of unified storage to design a scalable storage solution for a mid-sized enterprise.	16	BTL3	Apply
3	Analyze the components and architecture of Fibre Channel SAN. Include a neat diagram.	16	BTL4	Analyze
4	Evaluate the benefits and limitations of different FC SAN topologies.	16	BTL5	Evaluate
5	Design a virtualized FC SAN environment with zoning and link aggregation.	16	BTL6	Create
6	Compare the role of zoning and link aggregation in improving SAN performance.	16	BTL4	Analyze
7	Develop a SAN security model using software-defined networking principles.	16	BTL6	Create
8	Implement iSCSI-based IP SAN for a remote backup application. Describe configuration and benefits.	16	BTL3	Apply
9	Evaluate iSCSI vs FCIP protocols in terms of performance, reliability, and cost.	16	BTL5	Evaluate
10	Design a VLAN-based IP SAN topology with switch aggregation and link redundancy.	16	BTL6	Create
11	Analyze the architecture and benefits of Fibre Channel over Ethernet (FCoE).	16	BTL4	Analyze
12	Develop a FCoE storage environment using CEE and describe its advantages over traditional FC.	16	BTL6	Create
13	Apply virtualization in FC SAN to optimize resource usage and scalability.	16	BTL3	Apply
14	Examine the configuration and role of FCIP in extending SAN across geographic locations.	16	BTL4	Analyze
15	Design a hybrid storage solution using block, file, and object-based systems for a data analytics firm.	16	BTL6	Create
16	Evaluate unified storage architecture in simplifying IT management. Provide a use case.	16	BTL5	Evaluate
17	Propose a fault-tolerant SAN setup for a financial institution using FCoE and IP SAN technologies.	16	BTL6	Create

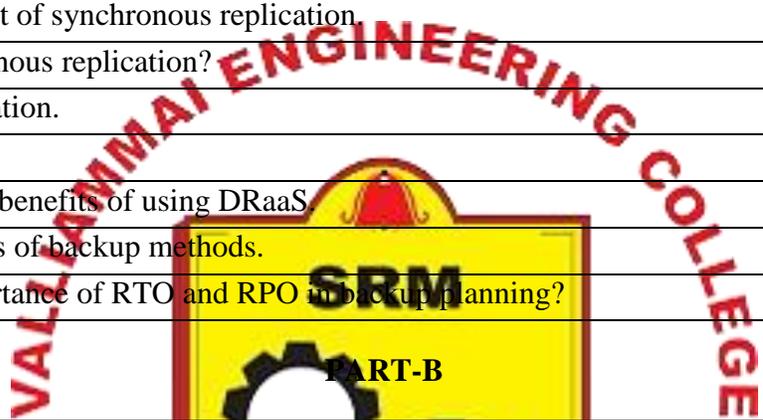
#### UNIT IV - BACKUP, ARCHIVE AND REPLICATION

**SYLLABUS:** Introduction to Business Continuity, Backup architecture, Backup targets and methods, Data deduplication, Cloud-based and mobile device backup, Data archive, Uses of replication and its characteristics, Compute based, storage-based, and network-based replication, Data migration, Disaster Recovery as a Service (DRaaS)

#### PART-A

Q.No.	Question	Level	Competence
1	Define business continuity.	BTL1	Remember
2	What is the purpose of backup in business continuity?	BTL2	Understand
3	Define backup architecture.	BTL1	Remember
4	List two backup targets.	BTL1	Remember
5	What is full backup?	BTL1	Remember

6	What is the difference between incremental and differential backup?	BTL2	Understand
7	Define data deduplication.	BTL1	Remember
8	Define data deduplication.	BTL2	Understand
9	What is cloud-based backup?	BTL1	Remember
10	State one advantage of mobile device backup.	BTL2	Understand
11	What is the role of archiving in storage management?	BTL2	Understand
12	List two differences between backup and archive.	BTL2	Understand
13	Define data replication.	BTL1	Remember
14	What are the key uses of replication?	BTL2	Understand
15	What is compute-based replication?	BTL1	Remember
16	Define storage-based replication.	BTL1	Remember
17	What is network-based replication?	BTL1	Remember
18	State a key benefit of synchronous replication.	BTL2	Understand
19	What is asynchronous replication?	BTL1	Remember
20	Define data migration.	BTL1	Remember
21	What is DRaaS?	BTL1	Remember
22	Mention any two benefits of using DRaaS.	BTL2	Understand
23	List two examples of backup methods.	BTL1	Remember
24	What is the importance of RTO and RPO in backup planning?	BTL2	Understand



Q.No.	Question	Marks	Level	Competence
1	Explain the concept of business continuity. How is it achieved through backup and replication strategies?	16	BTL4	Analyze
2	Design a backup architecture for an e-commerce organization. Include targets, methods, and scheduling.	16	BTL6	Create
3	Apply different backup methods (full, incremental, differential) in a hybrid IT environment.	16	BTL3	Apply
4	Compare various backup targets such as disk, tape, and cloud in terms of performance and cost.	16	BTL4	Analyze
5	Evaluate the role of data deduplication in optimizing storage efficiency.	16	BTL5	Evaluate
6	Design a cloud and mobile backup strategy for a remote workforce	16	BTL6	Create
7	Analyze the differences and use cases of backup vs. archive.	16	BTL4	Analyze
8	Apply archive policies for a government institution with large volumes of historical data.	16	BTL3	Apply
9	Discuss the use of replication in disaster recovery. What are its key characteristics?	16	BTL4	Analyze
10	Compare compute-based, storage-based, and network-based replication techniques.	16	BTL5	Evaluate
11	Design a storage replication solution for a banking system requiring high availability.	16	BTL6	Create

12	Evaluate synchronous vs. asynchronous replication in terms of performance and reliability.	16	BTL5	Evaluate
13	Propose a data migration plan during a data center upgrade.	16	BTL6	Create
14	Apply data migration techniques in transitioning from on-premises to cloud storage.	16	BTL3	Apply
15	Describe the architecture and working of Disaster Recovery as a Service (DRaaS).	16	BTL4	Analyze
16	Create a business continuity plan using DRaaS for a hospital information system.	16	BTL6	Create
17	Evaluate different disaster recovery strategies and choose the most suitable one for an educational institution.	16	BTL5	Evaluate

### UNIT V SECURING STORAGE INFRASTRUCTURE

**SYLLABUS:** Information security goals, Storage security domains, Threats to a storage infrastructure, Security controls to protect a storage infrastructure, Governance, risk, and compliance, Storage infrastructure management functions, Storage infrastructure management processes.

#### PART A

Q.No.	Question	Level	Competence
1	What are the primary goals of information security?	BTL1	Remember
2	Define confidentiality in the context of data security.	BTL1	Remember
3	What is meant by data integrity?	BTL1	Remember
4	Define availability in the context of storage security.	BTL1	Remember
5	List any two storage security domains.	BTL1	Remember
6	What is the role of access control in storage security?	BTL2	Understands
7	Define insider threat.	BTL1	Remember
8	Name two common external threats to a storage infrastructure.	BTL1	Remember
9	What is malware? How can it affect storage systems?	BTL2	Understand
10	Define DoS attack.	BTL1	Remember
11	What are security controls?	BTL1	Remember
12	List two physical security measures for storage infrastructure.	BTL1	Remember
13	What is encryption?	BTL1	Remember
14	What is authentication in storage security?	BTL2	Understand
15	Define governance in GRC.	BTL1	Remember
16	What does "risk" refer to in GRC?	BTL1	Remember
17	What is compliance in the context of information storage?	BTL1	Remember
18	Give one example of a compliance regulation.	BTL2	Understand
19	What is the purpose of audit logging in storage systems?	BTL2	Understand
20	Define storage infrastructure management.	BTL1	Remember
21	List two key functions of storage infrastructure management.	BTL1	Remember
22	What is provisioning in storage management?	BTL2	Understand

23	Define monitoring in the context of storage infrastructure.	BTL1	Remember
24	What is the difference between proactive and reactive storage management?	BTL2	Understand

### PART-B

Q.No.	Question	Marks	Level	Competence
1	Explain the goals of information security and how they apply to a cloud storage infrastructure.	16	BTL4	Analyze
2	Analyze the different storage security domains and their roles in protecting data.	16	BTL4	Analyze
3	Identify and discuss various internal and external threats to storage infrastructure.	16	BTL5	Evaluate
4	Design a security framework to mitigate threats to an enterprise storage system.	16	BTL6	Create
5	Apply encryption and access control to secure storage in a hybrid cloud environment.	16	BTL3	Apply
6	Compare security controls: physical, technical, and administrative, with examples.	16	BTL4	Analyze
7	Evaluate how firewalls, IDS/IPS, and authentication systems help in storage protection.	16	BTL5	Evaluate
8	Design a secure access control policy for a financial institution's storage network.	16	BTL6	Create
9	Describe the concepts of Governance, Risk, and Compliance (GRC) and their interrelation.	16	BTL4	Analyze
10	Propose a compliance strategy for a healthcare system dealing with patient data.	16	BTL6	Create
11	Analyze the importance of GRC in data-driven organizations.	16	BTL5	Evaluate
12	Apply risk management principles in identifying and mitigating vulnerabilities in storage.	16	BTL3	Apply
13	Develop a comprehensive incident response plan for a data breach in a storage system.	16	BTL6	Create
14	Discuss the key functions and responsibilities in storage infrastructure management.	16	BTL4	Analyze
15	Evaluate the efficiency of automated vs. manual storage management processes.	16	BTL5	Evaluate
16	Apply infrastructure management techniques to ensure data availability and compliance.	16	BTL 3	Apply
17	Create a proactive storage monitoring system design for a mission-critical application.	16	BTL 6	Create

