SRM VALLIAMMAI ENGINEERING COLLEGE

SRMNagar,Kattankulathur– 603203

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

QUESTIONBANK

VI SEMESTER

1908009--**Information Storage Management**

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Preparedby

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DEARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

SUBJECT : Information Storage of Managemaent

SEM / YEAR: VIII/IV

UNIT I -STORAGE SYSTEMS			
Introduction to Information Storage and Management: Information Storage, Evolution of Storage Technology and Architecture, Data Center Infrastructure, Key Challenges in Managing Information, Information Lifecycle. Storage System Environment: Components of the Host. RAID: Implementation of RAID, RAID Array Components, RAID Levels, RAID Comparison, RAID Impact on Disk Performance, Hot Spares.			
PART A			
Q.N	**Questions**	**BT Level**	**Compete**
1.	Define Digital Data.	BTL1	Remembe
2.	Tabulate the Disk Structure.	BTL1	Remembe
3.	Differentiate between Data and Information.	BTL2	Understan
4.	List the factors that used to grow the digital data.	BTL1	Remembe
5.	Point out the challenges faced by Information Storage.	BTL4	Analyze
6.	Give the advantages of digital data.	BTL2	Understan
7.	What are the limitations of data center?	BTL1	Remembe
8.	List the key characteristics of data center.	BTL1	Remembe
9.	Point out the benefits of information centric storage architecture.	BTL4	Analyze
10.	Define Big Data Analytics.	BTL1	Remembe
11.	Illustrate the structure of information centric storage architecture.	BTL3	Apply
12.	Classify the various types of cloud storage.	BTL4	Analyze
13.	Distinguish between IaaS and PaaS in cloud.	BTL2	Understan
14.	Give the characteristics of file system.	BTL2	Understan
15.	Show the schematic operation of operations of SCSI.	BTL3	Apply
16.	Classify Disk Service time.	BTL3	Apply
17.	Compose a rotational latency.	BTL6	Create
18.	Assess the limitation in terms of performance and management in storage device.	BTL5	Evaluate
19.	Develop the disk command queuing with suitable diagram.	BTL6	Create
20.	Give a reason why interface protocols enable between host and storage.	BTL2	Understand
21.	Show the Increase in data-processing capabilities:	BTL3	Apply
22.	Point out the Affordable and faster communication technology:	BTL 4	Analyze
23.	Assess the Lower cost of digital storage:	BTL5	Evaluate
24.	Summarize the Proliferation of applications and smart devices:	BTL5	Evaluate

PART – B			
1.	(i)Analyze the various types of storage system .(7) (ii)Explain in detail about virtualization and cloud computing. (6)	BTL4	Analyze
2.	Describe in detail about Big Data ecosystem. (13)	BTL2	Understand
3.	Analyze the evolution of storage architecture with neat diagram. (13)	BTL4	Analyze
4.	(i)Demonstrate the working principle of Platter.(7) (ii) Demonstrate the working principle of Read/Write head.(6)	BTL3	Apply
5.	(i)How does nested RAID used in storage system. (7) (ii)Identify the features of flash drive. (6)	BTL1	Remember
6.	(i)Explain the advantages of virtualized data center over a classic data center. (7) (ii)Which component constitutes the disk service time.(3) (iii) Which components contributes the largest percentage of the disk service time in a random I/O operations. (3)	BTL1	Remember
7.	Differentiate between types of RAID levels. (13)	BTL2	Understand
8.	(i)Classify the two methods of RAID implementation. (7) (ii)Examine the components of the RAID array. (6)	BTL3	Apply
9.	Generalize the role of RAID techniques. (13)	BTL6	Create
10.	(i)Examine the applications of IOPS and RAID configurations. (7) (ii)Describe the Hot Spares. (6)	BTL1	Remember
11.	Explain the key challenges in managing information. (13)	BTL4	Analyze
12.	Discuss the process of data recovery in case of a drive failure in RAID 5. (13)	BLT2	Understand
13.	Describe the impact of random and sequential I/Os in different RAID configurations. (13)	BTL5	Evaluate
14.	Summarize the benefits of using RAID 3 in backup application. (13)	BTL5	Evaluate
15.	Discuss: (i) Data transfer rate. (6) (ii) Seek time. (7)	BLT2	Understand
16.	What is structured and unstructured data? Examine The challenges of storing and managing unstructured data. (13)	BTL3	Apply
17.	(i) Describe the disk partition and concatenation. (6) (ii) Explain the process of mapping user files to disk storage. (7)	BTL1	Remember
PART -C			
1.	An application has 1,000 heavy users at a peak of 2 IOPS each and 2,000 typical users at a peak of 1 IOPS each. It is estimated that the application also experiences an overhead of 20 percent for other workloads. The read/write ratio for the application is 2:1. Calculate RAID corrected IOPS for RAID 1/0, RAID 5, and RAID 6. (15)	BTL5	Evaluate
2.	What is the stripe size of a five-disk RAID 5 set with a strip size of 32 KB? Compare it with the stripe size of a five-disk RAID 0 array with the same. strip size.(15)	BTL6	Create

3.	An application specifies a requirement of 200 GB to host a database and other files. It also specifies that the storage environment should support 5,000 IOPS during its peak workloads. The disks available for configuration provide 66 GB of usable capacity, and the manufacturer specifies that they can support a maximum of 140 IOPS. The application is response time-sensitive, and disk utilization beyond 60 percent does not meet the response time requirements. Compute and explain the theoretical basis for the minimum number of disks that should be configured to meet the requirements of the application. (15)	BTL5	Evaluate
4.	The average I/O size of an application is 64 KB. The following specifications are available from the disk manufacturer: average seek time = 5 ms, 7,200 RPM, and transfer rate = 40 MB/s. Determine the maximum IOPS that could be performed with this disk for the application. Using this case as an example, explain the relationship between disk utilization and IOPS.(15)	BTL6	Create
5.	How businesses use their information assets to derive competitive advantage and new business opportunities.(15)	BTL 5	Evaluate
	UNIT II -STORAGE NETWORKING TECHNOLOGIES		
	Direct-Attached Storage and Introduction to SCSI: Types of DAS, DAS Benefits and Limitations, Disk Drive Interfaces, Introduction to Parallel SCSI, SCSI Command Model. Storage Area Networks: Fiber Channel, SAN Evolution, SAN Components, Fiber Channel Connectivity, Fiber Channel Ports, Fiber Channel Architecture, Zoning, Fiber Channel Login Types, Fiber Channel Topologies.		
	PART – A		
1.	Define DAS.	BTL1	Remembe
2.	What is meant by SCSI?	BTL1	Remembe
3.	Express the idea of disk drive interfaces.	BTL2	Understan
4.	What do you know about ‘fiber channel’?	BTL1	Remembe
5.	Predict the functions of interface protocol.	BTL2	Understan
6.	Differentiate between FC SAN and IP SAN.	BTL2	Understan
7.	Formulate the modal dispersion.	BTL6	Create
8.	Show the multi-mode fiber and single mode fiber.	BTL3	Apply
9.	Define point-to-point connectivity.	BTL1	Remembe
10.	List the FC-AL configuration limitations in terms of scalability.	BTL3	Apply
11.	Give the functions of FC-SW transmission.	BTL2	Understan d
12.	Infer the advantage of FCP.	BTL4	Analyze
13.	Compare and contrast FC-4 layer and FC-2 layer.	BTL4	Analyze
14.	Develop the 24 bit FC address of N port.	BTL6	Create
15.	Assess FC class of services.	BTL5	Evaluate
16.	Pointout the types of Zoning.	BTL4	Analyze
17.	Assess the term ‘mesh topology’.	BTL5	Evaluate
18	Illustrate the fiber channel protocol stack.	BTL1	Remembe
19.	Demonstrate the switched fabric port.	BTL3	Apply
20.	Show the Single mode fiber.	BTL3	Apply
21.	What is Compute System	BTL1	Remembe
22.	Express the virtual memory manager	BTL2	Understan
23.	Define swap space	BTL 4	Analyze
24.	Assess the paging	BTL5	Evaluate
	PART-B		

1.	Examine Direct Attached Storage in detail.(13)	BTL1	Remembe r
2.	Give the detail about i) Command and status sequence number.(7) ii) FCIP(6)	BTL5	Evaluate
3.	Describe the FC SAN evolution in detail.(13)	BTL1	Remembe
4.	With a neat diagram explain components of FC SAN (13)	BTL1	Remembe
5.	Demonstrate the FC connectivity with neat diagram (13)	BTL3	Apply
6.	Summarize : i)The advantages of FCP (6) ii)Fiber channel switched fabric (7)	BTL2	Understan d
7.	With a neat diagram explain the data transmission in Fiber channel switched fabric. (13)	BTL4	Analyze
8.	Examine the Fiber channel Architecture in detail. (13)	BTL3	Apply
9.	(i)Explain the Fabric Services (7) (ii)Compare the Class 1, Class 2 and Class 3 services of Fabric channel. (6)	BTL4	Analyze
10	Summarize the Switched Fabric Login types (13)	BTL2	Understan
11.	Describe FC SAN Topologies. (13)	BTL6	Create
12.	(i) Explain the block level storage virtualization. (7) (ii)Write a note on Virtual SAN. (6)	BTL1	Remembe r
13.	(i) Discuss about component Core Edge Topologies. (7) (ii) Discuss benefits and limitations of Core Edge Fabric. (6) networks.(6)	BTL2	Understan d
14.	Analyze the types of Zoning. (13)	BTL4	Analyze
15.	(i) Demonstrate Fabric services provided by FC switches. (7) (ii) Explain the structure and organization of FC data (6)	BTL3	Apply
16.	Summarize: (i) Fiber channel arbitrated loop(6) (ii) SAN Management software.(7)	BTL2	Understan d
17.	Write short notes on **(i)** Fiber channel addressing (7) **(ii)** FC frame(6)	BTL5	Evaluate
	PART-C		
1.	Describe the process of assigning an FC address to a node when logging on to the network for the first time. (15)	BTL5	Evaluate
2.	Seventeen switches, with 16 ports each, are connected in a full mesh topology. How many ports are available for host and storage connectivity? (15)	BTL6	Create
3.	Discuss the roles of the name server and fabric controller in an FC-switched fabric. (15)	BTL5	Evaluate
4.	Explain storage migration using block-level storage virtualization. Compare this migration with traditional migration methods. (15)	BTL5	Evaluate
5.	How does file-level virtualization ensure nondisruptive file mobility?(7) Write the use of jumbo frames affect the NAS performance?(8)	BTL6	Create
	UNIT III -ADVANCED STORAGE NETWORKING AND VIRTUALIZATION		

IP SAN: iSCSI, FCIP. Content-Addressed Storage: Fixed Content and Archives, Types of Archives, Features and Benefits of CAS, CAS Architecture, Object Storage and Retrieval in CAS, CAS Examples. Storage Virtualization: Forms of Virtualization, NIA Storage Virtualization Taxonomy, Storage Virtualization Configurations, Storage Virtualization Challenges, Types of Storage Virtualization.			
PART – A			
1.	Define.iSCSI	BTL1	Remembe
2.	Tabulate internet Storage Name.	BTL1	Remembe
3.	Show the FCIT protocol stack.	BTL3	Apply
4.	Evaluate FCIT performance and security.	BTL5	Evaluate
5.	Define CAS .	BTL1	Remembe
6.	Classify the SendTargets discovery.	BTL3	Apply
7.	Differentiate between Hierarchical file systems and Flat address space.	BTL2	Understan
8.	Give the components OSD	BTL2	Understan
9.	List the Data storage process in OSD	BTL1	Remembe
10.	Discuss about the benefits of object based storage	BTL2	Understan
11.	Give the limitations of OSD	BTL2	Understan
12.	Analyze the purpose of CAS	BTL4	Analyze
13.	List the key features of CAS	BTL1	Remembe
14.	Classify the major functions in CAS	BTL4	Analyze
15.	Create discovery using iSNS.	BTL6	Create
16.	*Illustrate FCoE Frame Structure*	BTL5	Evaluate
17.	Show the differences between FCoE Enabling Technologies.	BTL3	Apply
18.	Point out the storage m virtualization taxonomy	BTL4	Analyze
19.	Generalize the storage virtualization configuration	BTL6	Create
20.	Define Storage Virtualization	BTL1	Remembe
21.	Give SendTargets discovery,	BTL2	Understan
22.	Show about iSCSI Qualified Name	BTL3	Apply
23.	Define Status sequence number	BTL4	Analyze
24.	Evaluate Data sequence number	BTL5	Evaluate
PART – B			
1.	Explain the components of iSCSI (13)	BTL5	Evaluate
2.	Describe the iSCSI topology in detail.(13)	BTL1	Remembe
3.	(i)Illustrate iSCSI protocol stack (7) (ii)Illustrate iSCSI PDU encapsulated in an IP packet. (6)	BTL3	Apply
4.	(i)Demonstrate iSCSI names. (7) (ii) What is iSCSI session? (6)	BTL3	Apply
5.	(i)Explain iSCSI command sequencing. (7) (ii) Why FCIP might require high network bandwidth. (6)	BTL6	Create
6.	Describe in detail about (i) FCIP Protocol stack (7) (ii) FCIP topology (6)	BTL1	Remembe r
7.	Classify the iSCSI Session in detail (13)	BTL4	Analyze
8.	Explain File systems and Network file sharing (13)	BTL2	Understan
9.	Describe in detail about NFS (13)	BTL1	Remembe r
10.	Summarize the File Level Virtualization (13)	BTL2	Understan d

11.	Explain object based storage architecture. (13)	BTL1	Remembe r
12.	Summarize the process of retrieval from OSD .(13)	BTL2	Understan d
13.	(i) Analyze the benefits of Object based storage (7) (ii) Describe Common used case for object based storage. (6)	BTL4	Analyze
14.	Explain the key features of CAS (13)	BTL4	Analyze
15.	(i) Explain the CAS use cases with example (6) (ii) Describe the components of unified storage (7)	BTL2	Understan d
16.	Show the object storage and retrieval process in an OSD system. (13)	BTL3	Apply
17.	Explain which object storage is better choice over SAN and NAS	BTL5	Evaluate

PART-C

1.	How does iSCSI handle the process of authentication? Give the available options. (15)	BTL5	Evaluate
2.	Compare various data center protocols that use Ethernet as the physical medium for transporting storage traffic. (15)	BTL6	Create
3.	Explain the storage and retrieval process for block, file, and object access in a unified storage system. (15)	BTL5	Create
4.	When is unified storage a suitable option for a data center? Justify your answer by comparing the unified storage offering with traditional storage solutions. (15)	BTL6	Evaluate
5.	Compare various data center protocols that use Ethernet as the physical medium for transporting storage traffic.(15)	BTL5	Create

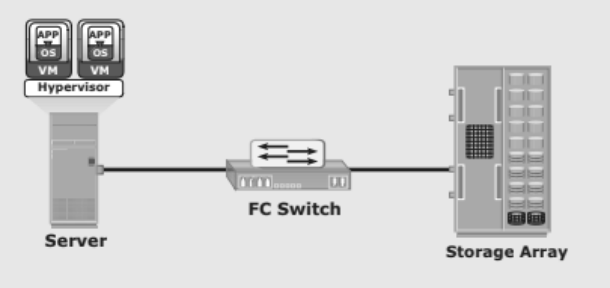
UNIT IV -BUSINESS CONTINUITY

Introduction to Business Continuity: Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, Business Impact Analysis, BC Technology Solutions. Backup and Recovery: Backup Purpose, Considerations, Granularity, Recovery Considerations, Backup

PART – A

1.	Define Information availability.	BTL1	Remembe
2.	Show the disruptors of information availability	BTL3	Apply
3.	Summarize the average cost of downtime per hour.	BTL5	Evaluate
4.	Examine MTPF	BTL3	Apply
5.	What is MTTRT?	BTL1	Remembe
6.	Classify the RPO.	BTL4	Analyze
7.	Develop a QC planning.	BTL6	Create
8.	Give single point of failure.	BTL5	Evaluate
9.	Analyze multi pathing software.	BTL4	Analyze
10.	Express the task which include in VIA	BTL2	Understan
11.	Distinguish the local replication and remote replication.	BTL2	Understan
12.	List the stages of BC planning.	BTL1	Remembe
13.	Differentiate between MTBF and MTTR	BTL4	Analyze
14.	List the goal of business continuity	BTL1	Remembe
15.	Design information availability metrics.	BTL6	Create
16.	Interpret disaster recovery.	BTL2	Understan
17.	Tabulate Backup purpose	BTL1	Remembe
18.	Identify measuring information availability.	BTL1	Remembe

19.	Interpret the strategies to meet RPO and RTO targets	BTL2	Understan
20.	Show established Objectives in BC planning	BTL3	Apply
21.	Analyze Authentication with a directory service such as Active Directory	BTL4	Analyze
22.	Give Causes of latency	BTL5	Evaluate
23.	Express Path maximum transmission unit	BTL2	Understan
24.	Examine Link aggregation	BTL3	Apply
	PART – B		
1.	(i)Discuss about process of information unavailability (7) (ii)Summarize measuring information availability (6)	BTL2	Understan d
2.	Illustrate recovery-point objective and recovery-time objective (13)	BTL3	Apply
3.	Demonstrate BC planning life cycle in detail.(13)	BTL3	Apply
4.	Integrate resolving single points of failure .(13)	BTL6	Create
5.	(i) Evaluate business impact analysis. (6) (ii) Evaluate set of task that includes in business impact analysis. (7)	BTL5	Evaluate
6.	Describe power path features in detail.(13)	BTL1	Remembe
7.	(i)Draw and explain the dynamic load balancing policy.(8) (ii) Explain IO operation without power path. (5)	BTL1	Remembe r
8.	Describe path failure without power path. (13)	BTL1	Rememb
9.	Explain path fail over with power path for an active-active array (13)	BTL4	Analyze
10.	Write short notes on Path failover with power path for an active-passive array.(13)	BTL1	Remembe r
11.	Explain the automatic path failover in detail.(13)	BTL2	Understan d
12.	Express the ways in which one or more copies of data maintained in business operations .(13)	BTL2	Understan d
13.	Classify the RTO recovery strategies to ensure data availability. (13)	BTL4	Analyze
14.	Point out how to calculate the IA with an example. (13)	BTL4	Analyze
15.	Explain in detail about Dynamic Load Balancing.(13)	BTL2	Understan d
16.	Illustrate in detail about BC Terminology.(13)	BTL3	Apply
17.	Give notes on i) Data Access from Unifi ed Storage. ii) Components of Unifi ed Storage	BTL5	Evaluate
	PART-C		
1.	Explain various planned and unplanned occurrences of information. (15) Unavailability in the context of data center operations.	BTL5	Evaluate
2.	Describe various planned and unplanned occurrences of information Unavailability in the context of data center operations. (15)	BTL5	Evaluate

3.	Refer to the storage configuration shown in the following figure:  Perform the single point of failure analysis for this configuration and provide an alternative configuration that eliminates all single points of failure.(15)	BTL6	Create
4.	A system has three components and requires all three to be operational 24 hours, Monday through Friday. Failure of component 1 occurs as follows: Monday = No failure Tuesday = 5 a.m. to 7 a.m. Wednesday = No failure Thursday = 4 p.m. to 8 p.m. Friday = 8 a.m. to 11 a.m. Calculate the MTBF and MTTR of component 1. (15)	BTL5	Evaluate
5.	What are the various business/technical considerations for implementing a backup solution, and how do these considerations impact the choice of backup solution/implementation? (15)	BTL6	Create

UNIT V -REPLICATION

Local Replication: Source and Target, Uses of Local Replicas, Data Consistency, Local Replication Technologies, Restore and Restart Considerations, Creating Multiple Replicas, Management Interface.

1	What is local replication?	BTL1	Remembe
2	Give the operation in replication environment.	BTL2	Understan
3	Differentiate local replication and remote replication.	BTL2	Understan
4	Show the uses of local replicas.	BTL3	Apply
5	Define replicas consistency.	BTL1	Remembe
6	Assess the dependent write consistency on sources.	BTL5	Evaluate
7	What is host-based local replication ?	BTL1	Remembe
8	Explain the LBM based mirroring.	BTL5	Evaluate
9	Express full-volume mirroring.	BTL2	Understan
10	Define pointer-based full-volume replication .	BTL1	Remembe
11	Show the condition occurs after the replication session initiate in CoFA	BTL3	Apply
12	List the various storage array based replication technologies.	BTL1	Remembe
13	Point out array-based local replication technologies	BTL4	Analyze
14	Analyze multiple replicas created at different PIT	BTL4	Analyze
15	Describe the journal volume..	BTL3	Apply
16	Develop Flushing the file system buffer .	BTL6	Create
17	Describe continuous data protection (CDP) .	BTL2	Understan
18	Differentiate CoFA in Read from target an Write to target	BTL4	Analyze
19	Compose Flushing the file system buffer	BTL6	Create
20	Differentiate network based local replication.	BTL1	Remembe
21	Describe Load balancing:	BTL2	Understan
22	Analyze Event notification:	BTL4	Analyze
23	Assess Define Self diagnosis and repair:	BTL5	Evaluate

24	Show the Data protection:	BTL3	Apply
	PART – B		
1.	Explain the common terms used to represent various entities and operation in a replication environment.(13)	BTL5	Evaluate
2.	i) Discuss about fast recovery and data migration.(6) ii) Give the various purposes of one or more local replicas of the source may be created. .(7)	BTL2	Understand
3	Compare and contrast the local replication technologies (13)	BTL4	Analyze
4.	(i) Summarize the advantages of LBM\-based replication (6) (ii) Describe about the limitation of LBM-based replication (7)	BTL2	Understand
5	i)List the uses of Local replica.(8) (ii)Write shot notes on Dependent write consistency on sources (5)	BTL1	Remember
6.	(i)Illustrate to production FS in detail (8) ii)Write short notes on Continuous Data Protection.(6)	BTL3	Apply
7.	i)Illustrate Continuous data protection — local replication.(7) ii)Examine Tracking changes in detail.(6)	BTL3	Apply
8.	Write short notes on Restore and Restart Considerations (13)	BTL1	Remember
9.	(i)What is Snap View Snapshot (7) (ii)Identify Snap View Clone (6)	BTL2	Understand
10.	Generalize the functions of (i) Time Finder/Clone (7) (ii) time Finder/Snap (6)	BTL6	Create
11.	(i)Identify the VM Snapshot captures.(7) (ii) Describe about the VM Clone (6)	BTL1	Remember
12	Explain Tracking Changes to Source and Replica.(13)	BTL2	Understand
13.	(i) Analyze theadministrator configures six pointer-based virtual replicas of a source LUN and creates eight full-volume replicas of the same LUN. The adminis-trator then creates four pointer-based virtual replicas for each full-volume replica that was created. How many usable replicas are now available?. (13)	BTL4	Analyze
14.	Explain the Flushing the file system buffer.(13)	BTL4	Analyze
15	illustrates the write operations to the production fi le system.(13)	BTL3	Apply
16	Describe Synchronous replication in detail.(13)	BTL1	Remember
17	Explain in detail about Network-Based Remote Replication.(13)	BTL5	Evaluate
	PART-C		
1.	Describe various techniques used to ensure consistency of a local replica. (15)	BTL5	Evaluate
2.	Explain the uses of a local replica in various business operations. (15)	BTL5	Evaluate
3.	Analyze the factors that determine storage capacity requirements for a save location in pointer-based virtual replication. (15)	BTL 5	Evaluate
4.	Describe continuous data protection technology and its benefits over array-based replication technologies. (15)	BTL 6	Create
5.	Analyze the RPO that can be achieved with synchronous, asynchronous, and disk-buffered remote replication. (15)	BTL6	Create