

Govt. of Karnataka, Department of Technical Education
Diploma in Computer Science
Sixth Semester

Subject: Information Storage and Management

Contact Hrs / week: 4

Total hrs: 64

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		1.3.2	Key Requirements for Data Center Elements	

		1.3.3	Managing Storage Infrastructure	
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		3.2.2	Spindle	
		3.2.3	Read/Write Head	
		3.2.4	Actuator Arm Assembly	
		3.2.5	Controller	
		3.2.6	Physical Disk Structure	
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		3.2.8	Logical Block Addressing	
	3.3		Disk Drive Performance	
		3.3.1	Disk Service Time	
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		3.4.4	File System	
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		4.3.3	Parity	
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	4.5		RAID Impact on Disk Performance	
		4.5.1	Application IOPS and RAID Configurations	
	4.6		Hot Spares	
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	6.2		The SAN and Its Evolution	
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		7.3.3	File Sharing	
	7.4		Components of NAS	
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		7.6.1	NFS	
		7.6.2	CIFS	
	7.7		NAS I/O Operations	
		7.7.1	Hosting and Accessing Files on NAS	
		7.7.2	Factors Affecting NAS Performance and Availability	
8			Content Addressed Storage	
	8.1		Fixed Content and Archives	
	8.2		Types of Archives	
	8.3		Features and Benefits of CAS	
	8.4		CAS Architecture	
	8.5		Object Storage and Retrieval in CAS	
	8.6		CAS Example	
		8.6.1	Health Care Solution: Storing Patient Studies	
9			Storage Virtualization	
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		9.1.3	Server Virtualization	

		9.1.4	Storage Virtualization	
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	9.3		Storage Virtualization Configurations	
	9.4		Storage Virtualization Challenges	
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		9.4.2	Functionality	
		9.4.3	Manageability	
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10			Backup and Recovery	
	10.1		Backup Purpose	
		10.1.1	Disaster Recovery	
		10.1.2	Operational Backup	
		10.1.3	Archival	
	10.2		Backup Considerations	
	10.3		Backup Granularity	
	10.4		Recovery Considerations	
	10.5		Backup Methods	
	10.6		Backup Process	
	10.7		Backup and Restore Operations	
	10.8		Backup Topologies	
		10.8.1	Serverless Backup	
	10.9		Backup in NAS Environments	
	10.10		Backup Technologies	
		10.10.1	Backup to Tape	
		10.10.2	Physical Tape Library	
		10.10.3	Backup to Disk	
		10.10.4	Virtual Tape Library	

Text book:

1. Information Storage and Management Storing, EMC education Servies, Wiley India Edition, ISBN: 9788126521470

Reference

1. Storage Networks Explained, Ulf Tropan, Rainer Erkens, Wofgang Muller, Wiley, ISBN: 9788126518326

General Objectives:

1. To Understand the Concept of Information Storage, Environment & Protection
2. To Know Direct Attached Storage & Intelligent Storage System
3. To Understand SAN with NAS & CAS
4. To Understand Storage Virtualization
5. To Know the Back up Recovery Technologies

Specific Objectives:

1	Introduction to Information Storage and Management
	Learn information storage types
	Evolution storage technologies
	What is the data center infrastructure
	To learn Challenges information management and Life cycle
2	Direct-Attached Storage & Introduction to SCSI
	Learn the Different types of DAS
	Narrate benefits & limitations DAS
	Classification of Disk Drive Interfaces
	Learn parallel SCSI with its Types & Command model
3	Storage System Environment
	Listing out Components of Storage System Environment
	Elaborate Disk Drive Component
	Learn the fundamentals Laws of governing Laws of Disk Performance
	Illustrates logical components of the host
4	Data Protection: RAID
	Learn implementation of RAID
	Classification RAID Levels
	RAID impact performance Analysis
5	Intelligent Storage System
	Learn component of Intelligent Storage System
	List the Intelligent Storage Array
6	Storage Area Networks
	Learn SAN its Evolution
	Learn Components of SAN
	FC connectivity
	Learn Fiber Channel Architecture
	FC Topologies
7	Network-Attached Storage
	General Purpose Server

	Benefits of NAS
	NAS file I/O
	What are the Components of NAS
	Different Types of NAS implementation
	Types of NAS , File Sharing Protocols
	I/O Operation of NAS
8	Content Addressed Storage
	Learn the types of Archives
	Learn features & Benefits of CAS
	Architecture of CAS
	Learn Object Storage & Retrieval in CAS
	AN Example case Study on CAS
9	Storage Virtualization
	Learn Different forms of Virtualization
	Virtualization Taxonomy
	Virtualization Configuration
	Virtualization Challenges
	Storage Virtualization Types
10	Backup and Recovery
	Learn Purpose of Back up
	Back up consideration & Granularity
	Recovery consideration , methods & Process
	Restore operation
	Topologies of Back up
	NAS Environment Back up
	Learn Backup Technologies

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Diploma in Computer Science & Engineering
Sixth Semester
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Max. Marks: 100

Max. Time: 3 Hours

Model Question Paper

- Note: 1. Section –I is compulsory.
2. Answer any TWO questions from each remaining Sections.

Section - I

- 1 a. Fill in the blanks
5x1=5
- i.
 - ii.
 - iii.
 - iv.
 - v
- b).Write a note on Key requirement for data center elements 5

Section – II

2. a).What are the characteristics of ILM? Explain. 5
b).What are the Benefits & limitation of DAS 5
c).Explain SCSI-3 Architecture 5
- 3 a). Write a note on the Physical component of Connectivity 5
b). What is meant by Zoned bit Recording? 5
c). How to measure the Disk Drive Performance? Explain 5
- 4 a). Explain the concept of mirroring in RAID 5
b). what is the significance of Parity in RAID ? 5
c). Explain how RAID 4 is different from RAID 3 5

Section-III

- | | | |
|----|--|----|
| 5 | a). Explain the components of Intelligent storage System | 10 |
| | b). Write a note on Mid range storage System | 5 |
| 6 | a). Define SAN. Explain its Evolution | 5 |
| | b). Write a note on Fiber Channel Arbitrated loop | 5 |
| | c). What is meant by Zoning ? Explain | 5 |
| 7. | a). Explain Fiber Channel Protocol Stack | 10 |
| | b). What are the Benefits of NAS ? Explain | 5 |
| | c). Compare NFS with CIFS | 5 |

Section -IV

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|-----|--|----|
| 8. | a). Explain the steps involved in hosting & accessing files on NAS | 5 |
| | b). Explain CAS Architecture | 10 |
| 9. | a). Write a note on Server Virtualization | 7 |
| | b). Explain file level Virtualization | 8 |
| 10. | a). Explain three Back up Topologies | 10 |
| | b). Write a note on Virtual tape library | 5 |