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Course Code

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Eighth Semester B.E. Degree Examinations, May 2026

STORAGE AREA NETWORKS

(Computer Science & Engineering)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTl:CO: PI)</u>
<u>Module-1</u>			
1.	a. Apply the concepts of data growth by analysing a real-world scenario and classify the different types of data involved.	10	(3 :1: 2.3.1)
	b. Illustrate the evolution of storage architecture by applying it to a modern enterprise setup.	10	(3 :1: 1.3.2)
(OR)			
2.	a. Demonstrate the process of mapping user files to disk storage using a suitable example.	10	(3 :1: 1.2.1)
	b. Apply the concepts of data centre design to identify core elements and justify key characteristics for an enterprise data centre.	10	(3 :1: 2.3.4)
<u>Module-2</u>			
3.	a. Apply RAID techniques to design a storage solution by selecting appropriate RAID levels based on given requirements.	10	(3 :2: 2.3.1)
	b. 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. Outline the merits and de-merits of Virtual storage provisioning.	10	(3 :2: 3.3.2)
(OR)			
4.	a. Apply the architecture of an intelligent storage system to explain how data is processed and managed.	10	(3 :2: 2.3.1)
	b. Analyse the impact of different RAID levels on disk performance using a suitable application scenario.	10	(3 :2: 2.3.2)
<u>Module-3</u>			
5.	a. Apply the iSCSI protocol stack to design a network-based storage solution and illustrate its topology.	10	(3 :3: 2.3.1)
	b. Demonstrate how NAS components and file-sharing protocols are used in a real-time file-sharing environment.	10	(3 :3: 1.3.1)

(OR))

Note: (RBTl - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

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| 6. | a. | Apply FCIP protocol concepts to establish connectivity between geographically distributed data centres. | 10 | (3 :3: 2.3.1) |
| | b. | Analyse NAS connectivity methods and apply factors affecting NAS performance to optimize a given system. | 10 | (3 :3: 2.3.1) |

Module-4

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| 7. | a. | Apply backup architectures and topologies to design a backup solution for an organization. | 10 | (3 :1: 1.2.1) |
| | b. | Apply the BC planning life cycle which includes five stages of a SAN to any operational system. | 10 | (3 :1: 1.2.1) |

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.

(OR)

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| 8. | a. | Apply information availability metrics to evaluate system downtime and its impact. | 10 | (3 :1: 1.2.1) |
| | b. | Perform a business impact analysis and apply data deduplication techniques to optimize backup storage. | 10 | (3 :1: 1.2.1) |

Module-5

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| 9. | a. | Apply storage security principles to design a secure FC SAN architecture. | 10 | (3 :1: 1.2.1) |
| | b. | Demonstrate local replication techniques and apply methods to ensure consistency in a replicated file system. | 10 | (3 :1: 1.2.1) |

(OR)

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| 10. | a. | Apply CoFA techniques in different scenarios (write to source, read from target, write to target) with suitable examples. | 10 | (3 :1: 1.2.1) |
| | b. | Apply remote replication technologies in a virtualized environment for data migration. | 10 | (3 :1: 1.2.1) |

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