Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (INFORMATION TECHNOLOGY/COMPUTER AND COMMUNICATION ENGG.) MAKE-UP EXAMINATIONS, JAN 2017

SUBJECT: STORAGE DEVICE TECHNOLOGY [ICT 417]

REVISED CREDIT SYSTEM
(04/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A. A hospital uses an application that stores patient X-ray data in the form of large binary objects in an Oracle database. The application is hosted on a UNIX server, and the hospital staff accesses the X-ray records through a Gigabit Ethernet backbone. An EMC CLARiiON storage array provides storage to the UNIX server, which has 6 TB of usable capacity. Explain the core elements of the data center. What are the typical challenges the storage management team may face in meeting the service-level demands of the hospital staff? Describe how the value of this patient data might change over time. **5**

1B. How do you use integrate and gateway NAS for storing data? Explain with diagram. **3**

1C. How do you measure availability of the information? **2**

2A. Consider a disk I/O system in which an I/O request arrives at the rate of 80 IOPS. The disk service time is 6 ms.

a. Compute the following: Utilization of I/O controller, Total response time, Average queue size, and Total time spent by a request in a queue.
b. Compute the preceding parameter if the service time is halved. **5**

2B. How native iSCSI is different from bridged iSCSI? **3**

2C. What makes a replica good in replication technology? **2**

3A. Acme Telecom is involved in mobile wireless services across the United States and has about 5000 employees worldwide. This company is Chicago based and has 7 regional offices across the country. Although Acme is doing well financially, they continue to feel competitive pressure. As a result, the company needs to ensure that the IT infrastructure takes advantage of fault tolerant features.

Current Situation/Issues:

- The company uses a number of different applications for communication, accounting, and management. All the applications are hosted on individual servers with disks configured as RAID 0.
- All financial activity is managed and tracked by a single accounting application. It **5**

is very important for the accounting data to be highly available.

- The application performs around 15% write operations, and the remaining 85 % are reads.
- The accounting data is currently stored on a 5-disk RAID 0 set. Each disk has an advertised formatted capacity of 200 GB, and the total size of their files is 730 GB.
- The company performs nightly backups and removes old information—so the amount of data is unlikely to change much over the next 6 months.

The company is approaching the end of the financial year and the IT budget is depleted. Buying even one new disk drive will not be possible.

How would you suggest that the company restructure their storage array environment? You will need to justify your choice based on cost, performance, and availability of the new solution.

3B. What are the different type backup topologies? Briefly explain each of them. **3**

3C. What are the limitations of host based replication in local replication method? **2**

4A. Explain how a CAS solution fits into the ILM strategy. **5**

4B. How does ISS implement high-end and midrange storage system? **3**

4C. Briefly explain Hot Spares. **2**

5A. What are the purposes of performing operation backup, disaster recovery, and archiving? Describe the benefits of using "virtual tape library" over "physical tapes." **5**

5B. Explain device model and addressing model of SCSI. **3**

5C. "LUN masking is access control mechanism". Justify. **2**

6A. What are different layers of FC protocol architecture? Explain functionalities of each layer and worldwide names. **5**

6B. How does three site replication eliminate the disadvantages of two site replication? How do you implement it? **3**

6C. List features of enterprise flash drive. **2**