Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

II SEMESTER M.TECH DEGREE END SEMESTER EXAMINATION, MAY 2016

SUBJECT: INFORMATION STORAGE AND MANAGEMENT (OPEN ELECTIVE)

[CSE 538]

DATE: 17-05-2016

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ANY FIVE** full questions.

❖ Missing data, if any, may be suitably assumed.

1A. Starting from Little's law and Utilization law of governing the disk performance derive the expressions for average response time, average queue length and time spent by a request in a queue.   5M

1B. Define data and discuss the types of data based on how it is stored and managed. List some of the factors that have contributed to the growth of digital data.   3M

1C. Write a note on Logical Unit Number and LUN masking.   2M

2A. Draw a neat diagram of RAID array components. Define striping and write a note on its types. Prepare a table showing the requirement of minimum number of disks required to implement the various types of RAID levels.   5M

2B. Consider a SCSI interface with a throughput of 160MB/s and disk service time 0.3ms. Given with the data average seek time of 5ms, Disk rotation speed of 10,000rpm, 40MB/s is the internal transfer rate. Find IOPS performed by the SCSI controller and by the disk drive when I/Os are serviced with block sizes 32KB and 64KB.   3M

2C. What do you mean by flushing? Name the types of it.   2M

3A. With appropriate diagram explain the process of data transmission in an FC-AL configuration of FC connectivity in SAN.   5M

3B. Bring the importance of logical unit of SCSI target device. Write a detailed note on *ctd* addressing in parallel SCSI addressing.   3M

3C. Bring out the benefits and limitations of Direct-Attached Storage.   2M

4A. With neat diagram explain the architecture of EMC CENTERA.   5M

4B. How do you differentiate integrated NAS and gateway NAS?   3M

4C. Write short note on NAS file sharing protocols.   2M

5A. What are the advantages offered in using virtual tape over both physical tapes and disks? What are the steps involved in restore operation in backup infrastructure. 5M

5B. What is the significance of PowerPath. Explain the importance of *Down time of a storage system with a service of "four 9's available"*. 3M

5C. Define the following:
   i) MTTR
   ii) Average cost of downtime per hour 2M

6A. List out the Remote replication technologies. Explain Disk-buffered remote replication mode with appropriate diagram. 5M

6B. Explain the LVM based mirroring technology as applied to the host based local replication with appropriate diagram. 3M

6C. List the four disadvantages associated with LVM based mirroring technology. 2M