(3 hours) [80 marks]

Note: 1. Question number 1 is compulsory. Solve any three out of remaining.
2. Draw figure wherever necessary.
3. Assume suitable data wherever necessary.

1 (a) Consider an application that requires 1TB of storage capacity and performs 4900 IOPS. Application I/O size is 4 KB. As it is business critical application, response time must be within an acceptable range. Specification of available disk drive: **10M**
Drive capacity = 73 GB;
For rotational latency RPMs: 15,000 rpm;
Average seek time= 5ms;
Transfer rate: 40 MB/s;
- Calculate the number of disks required?

Considering seek time (Rs=5ms) as given above and I/O request arrives at a rate 100 I/Os per second, Calculate Utilization of I/O controller (U), Total Response time (R), Average Queue size and Total time spent by request in a queue.

(b) An application that generates 2400 IOPs with 40% reads and 60% writes. Calculate the IOPS generated for RAID level 1, 4 and 6. Also calculate storage efficiency and usable capacity for RAID levels 3, 5 and 6 with number of disks available are 5 and each disk has storage capacity of 120 GB. **10M**

2 (a) Compare and contrast RAID levels **10M**

(b) Explain Information Lifecycle Management for online order processing with the help of diagram. **10M**

3 (a) Explain Intelligent Storage System and its types. **10M**

(b) Explain FC addressing with respect to WWNN and WWNS. **10M**

4 (a) Explain SCSI communication and command model. **10M**

(b) Explain BC planning lifecycle in detail. Give comparison between RPO and RTO. **10M**

5 (a) What is virtualization? Explain its types with the help of neat labelled diagram. **10M**

(b) Differentiate Boolean based and probabilistic based matching process. **10M**

6 Write short notes on: **(any four)** **20M**
a. Journaling and Snapshot.
b. Document Surrogates.
c. Information System.
d. Local file system and network file system.
e. Types of indexing.
f. Zoned Bit Recording.

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