

Questions

Average Seek (read)	8.5 msec	Number of Heads	16
Average Seek (write)	9.5 msec	Sectors per track	63
Average Latency	4.16 msec	Bytes per sector	512 bytes
Spindle Speed	7200 rpm	Tracks per cylinder	16
Number of Cylinders	16383	Transfer rate (max)	85 MB/sec

Table 1: Technical specifications of a hard disk

- Q.1)** Compute the size of an hard disk referring to the values given in Table 1? **(8 points)**
- Q.2)** Referring to the values given in Table 1, how long does it take to transfer a file of size 74752 KB from an hard disk
- (a) when it is read sequentially? **(8 points)**
 - (b) when it is read randomly? **(8 points)**
- Q.3)** Compare and contrast logical and physical file concepts. **(8 points)**
- Q.4)** Consider that you are given a module for internal sorting of 1K records. Using this module, write a program in pseudo-code to merge sort 10K records when you are allowed to allocate sufficient memory to keep only 5K records in the memory at a time. **(15 points)**
- Q.5)** Insert the below given keys in the order stated into an initially empty B-tree
- (a) of order 4. **(10 points)**
 - (b) of order 7. **(10 points)**
- a, g, f, b, k, d, h, m, j, e, s, i, r, x, c, l, n, t, u, p
- Q.6)** What is the smallest number of keys that will force a B-tree of order **16** to have height **2** (i.e. **3** levels) if inserted in an appropriate order? **(8 points)**
- Q.7)** In your first assignment, you implemented a binary search tree in memory and kept it sorted after addition and deletion operations. Considering an implementation of such a binary search tree in a file;
- (a) Name the fields and their use in a node. **(8 points)**
 - (b) Write a binary search algorithm in either pseudo-code or C/C++ programming language using such an index file. **(17 points)**