Operating Systems Tutorial - 3

Q – 1 Consider a file system that has 2,048 byte blocks and 32-bit disk block pointers to those blocks. Each file header has 12 direct pointers, one singly- indirect pointer, one doubly-indirect pointer, and one triply-indirect pointer.

i) How large of a disk can this filesystem support?
ii) What is the maximum file size?

Q – 2 Suppose that we have a disk with the following parameters:
• 750GB in size
• 12000 RPM, Data transfer rate of 40 Mbytes/s (40 × 10^6 bytes/sec)
• Average seek time of 8ms
• ATA Controller with 2ms controller initiation time
• A block size of 4Kbytes (4096 bytes)
What is the average time to read a random block from the disk (assuming no queueing at the controller)

Q - 3 At time X, the request queue for a disk contains the following requests in [track:sector] form:
[10:5], [22:9], [20:21], [21:9], [2:10], [40:45], [6:7], [38:9] .... (in this order).
Assume that the disk head is currently positioned over cylinder 20. What is the sequence of reads under the following head scheduling algorithms?

a) Shortest Seek Time First
b) SCAN (initially moving upwards)

Q -4 Discuss the functions of Dalvik VM and enumerate the differences between JVM and Dalvik VM?

Q -5 Explain various mechanisms used for implementing app-level security in android?

Q -6 Explain the functions of Zygote. Discuss how namespaces and control groups can be alternative to Zygote and Dalvik VM?