12.

Solution,

Here,

No of tracks= 500

No of sectors per track= 20

No of surface =2

No of char per sector= 1024

1. Total characters =

No of char per sector \* no of sectors per track \* no of tracks \* no of surface

=1024 \* 20 \* 500 \* 2= 20480000

1. Best case

* Seek time= 0
* Latency= 0
* Transfer =0.42

Average Case

* Seek time = 8 i, e { 0.5 + (150 x0.05)}
* Latency= 4.17
* Transfer= 0.42

Worst Case

* Seek time= 25.45
* Latency =8.33
* Transfer= 0.42

13.

For Seek time

Best case, since there is no arm movement seek time: 0 msec

Average case: no of tracks x arm movement + startup time

= 0.5 + (150 x 0.05)

= 8 msec

Worst case:

Movement of Arm track- 0 to 499

= startup time + no of track x arm movement

= 0.5 + (499 x 0.05)

= 25.45 msec

For Latency

**Best case:** no latency

**Average:** Half revolutions of disc.

Total revolution= 9600 per minute

No of revolutions per sec = no of revolutions/ 60

1 revolution = 6.25 msec

**Worst case**:

One complete revolution

=9600/60

= 160 revolutions per second

1 revolution takes 6.25 msec

Time taken for half revolution = 6.25/2 = 3.125 msec

Transfer time

It is time to transfer 1/20 of the track. So it is same for all the cases

Transfer time = 1/20 x 6.25 msec

= 0.3125 msec

**Access time**

**Best case** = 0+0+ 0.3125 = 0.3125 msec

**Average case**= 8+3.125+ 0.3125 = 11.4375 msec

**Worst case** = 25.45 + 6.25 + 0.3125 = 32.0125 msec

14.

Here,

File size= 50kb = 51200 bytes

No of sectors =20 in each track

Storage for each sector = 2014 characters

No of sectors required to store 51200 = 51200/1024

= 50 sectors

No of tracks to store 50 sectors= 50/20 = 2.5

Therefore, to speedup information access file should be stored in 2.5 continuous sectors.

15.

Seek time

= 0 MS for all the cases

Latency:

Best case: 0 msec

Since, one revolution takes 8.33 msec

Average: revolution time/2

= 8.33/2 = 4.17 msec

Worst case: total time taken for 1 revolution

= 8.33 msec

Transfer time:(Same for all the cases)

= 1/20 of a sector

=1/20 x 8.33

=4.17 msec

Now,

Access time

Best case= 0+0+0.417 = 0.417 msec

Average case= 0 +4.17 + 0.4165 = 4.5865 msec

Worst case = 0 + 8.33 + 0.4165 = 8.7465 msec

16.

Worst case seek time = arm movement x no of tracks moved

= 0.5 + (499 x 0.05)

= 25.45 msec

Worst case latency = one revolution by disc

= 7200/60= 120 rev/sec

1 revolution= 1/120 = 8.33 msec

Worst case transfer time = time to transfer 1 sector i.e. (1/20)

= 8.33 /20 = 0.4165 msec

Worst case access time = seek time + latency + transfer time

= 25.45 + 8.33 + 0.4165

= 34.1965 msec

Therefore, there are:

20 sectors per track

500 tracks per surface

2 surfaces

SO,

Worst case:

=worst case access time per sector x number of sectors per track x no of tracks per surface x surface no.

=341965 x 20 x 500 x 2

=68.393 sec