CS 143 Homework 5

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1. Average seek time = 10ms
   Average rotational delay = $\frac{0.5}{6000/60} = 5$ms
   Transfer time = $\frac{1}{(6000/60)\cdot 500} = 0.02$ms
   Therefore the average read time is $10 + 5 + 0.02 = 15.02$ms.

2. Each tuple takes $2 + 5 * 4 + 30 + 20 = 72$ bytes to store, so 1000 tuples would take $72,000$ bytes which would require $72000/1024 = 70.31 \approx 71$ blocks to store.

3. We would need to scan through all the tuples once so we would have a transfer time of $\frac{71}{(6000/60)\cdot 500} = 1.42$ms. Adding in the average seek time and rotational delay from question 1 we have a total read time of 16.42ms.

4. For each cluster we would have a transfer time of $\frac{3}{(6000/60)\cdot 500} = 0.06$ms, but we would need to to seek and rotate once for every cluster. Therefore we have $24 * (10 + 5 + 0.06) = 361.44$ms.

5. The expected time would depend on how many tuples satisfy "year=2005"; since we have a non-clustering index on the year attribute, we can go to the "year=2005" tuples directly without needing to scan through the entire table.