CDB3034 Exercises on Heap Files - Cost Modelling

Consider a problem of data storage/retrieval:
Available on the machine for an application:

- 64Mb main memory
- 1Mb main memory allocation for buffer (area of main memory in which data from disk is placed)
- 64Gb disk
- The application has 10,000,000 records of 100 bytes each.
- The key value is a single attribute employee_number.

Question 1) Does the data fit on the disk?

Question 2) Does all the data fit in main memory at once?

Question 3) Assume that 2,000 records fit per disk page. How many pages are required to hold the data?

With a disk access taking 0.015 secs, how long does it take for an exhaustive search of the file stored as a heap?

Question 4) Repeat question (3) with:
a) 100 records per disk page

b) 10,000 records/disk page.

Question 5) Can the number of records/page be increased further?

Question 6) What is the average cost of finding a particular record in this file with 2,000 records/page using a heap access method?

Question 7) What is the average cost of inserting a particular record into this file with 2,000 records/page using a heap access method?