

## 2002 Paper 5 Question 1

### Data Structures and Algorithms

You have available a 20 Gbyte disc on which you need to hold an indexed sequential file consisting of variable length records each having a 20 byte key. Records, including the key, are typically 500 bytes long but never exceed 1000 bytes. The total size of all the records is never more than 10 Gbytes.

- (a) Suggest, in detail, how you would represent this file on the disc. You should choose an organisation that allows
- (i) efficient insertion of new records,
  - (ii) efficient updating of existing records identified by key, and
  - (iii) efficient inspection of all records in key order.

[14 marks]

- (b) If the total size of the database is 10 Gbytes, estimate, for your organisation of the file, how many disc transfers would be needed to access a record with a given key, and estimate how many transfers would be required to read the entire database in sequential order.

[6 marks]