CS30202: Database Management Systems
Class Test II

Time: 1 hour   **Marks: 20**

Roll No.:   **Name:**

1. Consider a disk with a sector size of 512 bytes, 2000 tracks per surface, 50 sectors per track, five double-sided platters, and average seek time of 10 msec. The disk platters rotate at 5400 rpm.

(i) What is the capacity of the disk? Show your calculation.   [2]

(ii) What is the maximum rotational delay in seconds?   [2]

(iii) If one track of data can be transferred per revolution, what is the transfer rate?   [2]

(iv) Explain the structure of RAID2 and RAID5. Discuss their relative advantages and disadvantages.   [4]

2. (i) Describe the slotted page structure used to store variable length records with a diagram. [4]

(ii) Suppose we have an empty page with a size of 4,096 bytes. Use a diagram to show the layout of the page after we insert 3 new records to the page with a byte-array size of 30, 25, and 35, respectively. We assume each offset takes 2 bytes, and each array length also uses 2 bytes. [3]

(iii) Consider the following relation:

```
CREATE TABLE products (
    id INTEGER PRIMARY KEY, -- cannot be NULL
    stock INTEGER NOT NULL,
    price INTEGER NOT NULL,
    name VARCHAR(10) NOT NULL,
    category CHAR(6) NOT NULL,
    serial_number CHAR(20) -- may be NULL!
);
```

Assume that a field of VARCHAR(n) takes up at most n bytes. Record headers take up 8 bytes, and integers are 4 bytes long. Note that columns in a primary key cannot be NULL. What are a possible size, in bytes, for a record of the products relation, assuming a variable-length representation with a record header? [3]

ROUGH WORK