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1. Which of the following statement(s) is FALSE?

(i) A hash function takes a message of arbitrary length and generates a fixed length code.

(ii) A hash function takes a message of fixed length and generates a code of variable length.

(iii) A hash function may give the same hash value for distinct messages.

A. i only
B. ii and iii only
C. [Correct Answer] [Your Answer] ii only
D. i and iii only
E. None of the other options are correct.

2. Given a hash table `T` that can store 3000 elements and has 15 slots, the load factor `alpha` for `T` is:

A. 0.025
B. None of the other options are correct.
C. 0.05
D. [Correct Answer] [Your Answer] 200
E. 400

3. The CS department wants to maintain a database of up to 1800 UINs of students who have taken CS 225 so that it can be determined very quickly whether or not a given student has taken the course. Efficient use of memory and speed of response are equally important. Which of the following data structures would be most appropriate for this task?

A. [Your Answer] A hash table using probing with capacity 1800
B. A hash table using probing with capacity 1000
C. A sorted linked list
D. A sorted array with 1800 entries
E. [Correct Answer] A hash table using probing with capacity 4500

4. Suppose a hash table has size 10, and that the search keys are strings consisting of 3 lower case letters. We want to hash 7 unknown values from this keyspace. In the hash function, when we refer to the alphabet positions of the letters, we mean: `a = 1, b = 2, …, z = 26` and `h(k) = ({sum of the alphabet positions of k's letters}) mod 10`

Which of these ideal hash function characteristics are violated by this hash function?

(i) A good hash function is deterministic.

(ii) A good hash function distributes the keys uniformly over the array.

(iii) A good hash function is computed in constant time.

A. At least two of (i), (ii) and (iii) are violated.
B. [Correct Answer] None of these characteristics are violated.
C. Only (i) is violated.
D. [Your Answer] Only (ii) is violated.
E. Only (iii) is violated.

5. Which of the following statesment(s) are correct about collision?

i) Two entries are identical except for their keys.

ii) Two entries with different data have the exact same key.

iii) Two entries with different keys have the same exact hash value.

iv) Two entries with the exact same key have different hash values.

A. i and iii only
B. [Correct Answer] [Your Answer] iii only
C. iV only
D. ii and iii only
E. i only