DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: (IT502) DATABASE MANAGEMENT SYSTEM

Examination	**:Second Sessional**	**Seat No.**	**: _____**
Date	**: 7/9/2013**	**Day**	**: Saturday**
Time	**: 11.15 to 12.30**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

(a) If attribute A determines both attributes B & C, then it is also true that, **[1]**
(A) A → B (B) B→ A (C)C→ A (D)BC→ A

(b) _____ Index improves the performance of queries that use other than the search key of the primary index. **[1]**

(c) Which of the following statements about normal forms is false? **[1]**
(A) BCNF is stricter than 3NF.
(B) Loss less, Dependency preserving decomposition in 3NF is always possible.
(C) Loss less, Dependency preserving decomposition in BCNF is always possible.
(D) Any relation with two attributes is in BCNF.

(d) State the difference between dense and sparse indices. **[2]**

(e) Following data structure is preferable for data retrieval in queries which specifies a range of values. **[1]**
(A) B tree (B) Hashing (C) B+ tree (D) All

(f) State the advantages of variable length records over fixed length records. **[2]**

(g) Find the equivalence of two sets. **[2]**
F={A→ C, AC→ D,E→ AD, E→ H} G={A→ CD, E→ AH}

(h) Given the following set of FDies R= {A→ BC, CD→ E, B→ D, E→ A}, compute minimal cover. **[2]**

Q.2 Answer the following questions. Any two. **[12]**

(a) Explain different types of organization of records in Files. **[6]**

(b) I. Consider following library database. **[3]**
Book(title, author, catalog_no, title, author, price)
Collection (title, author, catalog_no) and given the following FDies.
1. {title, author }→ catalog_no
2. catalog_no → title, author, publisher, year
3. {publisher, title, year} → price

Assume **author, title** is key for both schemas, which of the following is true.
(A)Both book and collection are in BCNF.
(B) Both book and collection are in 3NF only.
(C)Book is in 2NF and collection in 3NF.
(D) Both book and collection are in 2NF only.

II. Explain steps in query processing. Perform materialization for the following expression. **[3]**

$$\pi_{ssn}(\text{Student} \times \text{Registered} \times (\sigma_{title='Database\ Systems'}\text{Course})) \cup \pi_{ssn}(\text{Student} \times \text{Registered} \times (\sigma_{title='Analysis\ of\ Algorithms'}\text{Course}))$$

(c) Explain the various types of indices with appropriate example. **[6]**

Q.3 (a) Construct B+ tree for following data. Fan-out of B+ tree is 4. **[8]**
3,5,11,30,35,100,110,101,120,130,42,9,165,170
After construction Delete **110**, Delete **130**

(b) Consider schema R(ABCDE) with decomposition into R1(ABC) and R2(ADE) and following set of FDies in F = {A→ BC, CD→ E, B→ D, E→ A} **[4]**

I. Show whether that the decomposition is Lossy or Loss less. **[2]**

II. Show whether that Is it dependency preserving or not. **[2]**

OR

Q.3 (a) Create an Extendable Hash structure for the following key values: **[8]**
x={12, 03, 52,45, 68, 75, 19, 26, 83, 64, 57, 37, 72, 46 }
Assume that one bucket can store maximum 3 keys at a time where the hash function is H(x) = x mod 3.

(b) Explain Data Dictionary storage. **[4]**