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

Examination	**:Second Sessional**	**Seat No.**	**: _____**
Date	**: 05/09/2017**	**Day**	**: Tuesday**
Time	**: 11.30 to 12:45**	**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) From the following instance of relation schema R(A,B,C), we can conclude that : **[1]**

A	B	C
1	1	1
1	1	0
2	3	2
2	3	2

(A) A functionally determines B and B functionally determines C.
(B) A functionally determines B and B does not functionally determines C.
(C) B does not functionally determine C.
(D) A does not functionally B and B does not functionally determines C.

(b) Why is a hash structure not the best choice for a search key on which range queries are likely? **[1]**

(c) Consider the following relation and its functional dependencies. **[2]**
r(A,B, C, D, E) F:{AB→CDE A→C B→D}
Normalize the above relation to BCNF.
A. r1(A, C); r2(B, D); r3(A,B,C, D, E)
B. r1(A, C); r2(B, D); r3(A,B,C, E)
C. r1(A, C); r2(B, D); r3(A,B,D, E)
D. r1(A,C); r2(B,D); r3(A,B,E)

(d) What kinds of problems are not handled by 3NF? Why? **[2]**

(e) Let relation R(A,B,C,D,E,F,G,H) satisfy the following functional dependencies F: {A→ B,CH → A, B→ E, BD→C, EG → H, DE → F }. Find out all possible candidate key of R. **[2]**

(f) The following query throws an error. Choose the all correct reasons for the error as given in the options. **[2]**

```
SELECT first_name, last_name
FROM employees
WHERE commission_pct  = (SELECT min(commission_pct )
      FROM employees
      GROUP BY department_id);
```

A. The GROUP BY clause is not required in the sub-query
B. A function cannot be used in a sub-query SELECT statement
C. The single row sub-query gives multiple records
D. The use of "=" operator is invalid; an IN operator will work correctly

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

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

(a) Consider relation R with set of FDies (F) as: **[6]**

R(ABCDEF)

F = { AB→CDEF, C→A, D→B, C→D, E→F, B→E }

(i) Find the Normal form of the above relation. **[3]**

(ii) Decompose it into highest Normal Form. **[3]**

Note: Justify your answer in detail.

(b) (I) Find whether the given set F and G are equivalent or not. *Note: Show each and every step with proper explanation.* **[3]**

F = { B→CD, AD→E, B→A}

G = { B→CDE, B→ABC, AD→E }

(II) Find the Irreducible set (canonical cover) of following set of functional dependency set F. *Note: Show each and every step with proper explanation.* **[3]**

F={ABD→E, AB→G, B→F, C→J, CJ→I, G→H}

(c) Explain storage organization techniques for variable length records. **[6]**

Q.3 (a) A PARTS file with Parts# as hash key includes records with the following Parts values: 2369,3760,4692,4871, 5659, 1821, 1074, 7115, 1620, 2428, 3943, 4750, 6975, 4981, 9208. Each bucket is one disk block and holds three records. Load these records into the file in the given order, using extensible hashing. Use hash function h(K) = K mod 8. **[7]**

(b) Draw the B+ tree for the following search key values. **[5]**

Insert: 10,15,5,20,25,28,30,55,50,70,75,60,65,80,95,60,85. Where fan-out =4.

OR

Q.3 (a) Draw the B tree for the following search key values **[7]**

10,15,5,20,25,28,30,55,50,70,75,60,65,80,95,60,85 and the Delete: 70,25,60 where fan-out=4.

(b) (I)Explain desirable properties of decomposition. **[3]**

(II)List out types of Indices in DBMS. **[2]**