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

Examination	**:Second Sessional**	**Seat No.**	**: _____**
Date	**: 07/09/2016**	**Day**	**: Wednesday**
Time	**: 12.45 to 02:00**	**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) In SQL, testing whether a sub query is empty is done using **[1]**
(A) DISTINCT (B) EXISTS
(C) NULL (D) UNIQUE

(b) Which is not the desirable property of decomposition? **[1]**
(A) Lossy join decomposition. (B) Dependency preservation.
(C) Repetition of information. (D) Lossless join decomposition.

(c) Relation R has eight attributes ABCDEFGH. Fields of R contain only atomic values. **[1]**
F = {CH → G, A → BC, B → CFH, E → A, F → EG} is a set of functional dependencies (FDs) so that F+ is exactly the set of FDs that hold for R. The relation R is
(A) in 1NF, but not in 2NF (B) in 2NF, but not in 3NF
(C) in 3NF, but not in BCNF (D) in BCNF

(d) Difference between multi-level and secondary indices. **[1]**

(e) "BCNF is stronger than 3NF". Justify statement with appropriate example. **[2]**

(f) Find out all candidate keys for following relation. **[2]**
R(A B C D E F G H I J) AND
F: ABD→E, AB→G, B→F, C→J, CJ→I, G→H, H→C

(g) Differentiate between B-Tree and B^+ -Tree data structure. **[2]**

(h) True or False, Justify: Secondary indices must be a sparse index. **[2]**

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

(a) Consider Relation schema R(carReg, hireDate, make, model, custNo, custName, outletNo, outletLoc) and Set of FD: **[6]**
Fd1: carReg,hireDate→custNo,custName
Fd2: carReg→ make, model, outletNo, outletLoc
Fd3: model → make, Fd4: custNo → custName,
Fd5: outletNo → outletLoc
Normalize schema R up to highest normal form. *Note: Show each and every step with proper explanation.*

(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={A→BC, CD→E, B→D} G={A→B, BC→E, ED→A} **[3]**
(II) Find the Irreducible set (canonical cover) of following set of functional dependency. *Note: Show each and every step with proper explanation.*
F={A→BC, B→CE, A→E, AC→H, D→B}

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

Q.3 (a) Draw the B+ tree for the following search key values. **[6]**
Insert: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 125, 178 and the Delete: 178, 125, 120 Where fan-out =3.

(b) Create an Extendable Hash structure for the following key values: **[6]**
x={64,44,9,25,5,10,3,31,15,7,63,17,13}
Assume that one bucket can store maximum 3 keys at a time where the hash function is H(x) = k = x % 4.

OR

Q.3 (a) Draw the B+ tree for the following search key values **[6]**
4,9,15,18,8,22,12,20,30,21,35,40,29,33,45,39 where fan-out=3.

(b) (I) Explain steps required in query processing. **[3]**

(II) What do you mean by Data Dictionary in Relational database system? Which information the system must store? **[3]**