***Database Systems & WEB***

Q1. . Consider the relation R(A, B, C, D, E) with the set of function dependencies

F={A, B-> C, D-> E, A-> D}

(i) Is AB a candidate Key? Justify.

(ii) Giving reasons find out whether R is in 3NF.if not, decompose into 3NF.

Q2. Given R(A,B,C,D,E) with the set of FDs,

F{AB-> CD, ABC -> E, C-> A}

(**i)** Find any two candidate keys of R

**(ii)** What is the highest normal form of R? Justify

3. Consider the relation for published books:

BOOK (Book\_title, Authorname, Book\_type, Listprice, Author-affil, Publisher)

Suppose the following dependencies exist:

Book\_title --> Book\_type, Publisher

Book\_type--> Listprice

Authorname --> Author-affil

(Note: Author\_affil stands for author’s affiliation).

Decompose BOOK into BCNF

Q4. For each of the following relation schemas and sets of FD’s:

(i) R is (A, B, C, D) with FD’s A -> B, B -> C, C -> D, D -> A.

(ii) R is (A, B, C, D) with FD’s B -> C and B -> D.

Identify candidate keys for R. Indicate BCNF violations and decompose if necessary. Indicate

3NF violations and decompose if necessary.

5. Give lossless-join decomposition into BCNF of R = (A, B, C, D, E) with the set of functional

dependencies:

A -> BC, CD -> E, B -> D, E -> A.

6. Suppose you are given a relation *R* with four attributes *ABCD*. For each of the following sets

of FDs, assuming those are the only dependencies that hold for *R*, do the following: (a) Identify

the candidate key(s) for *R*. (b) Identify the best normal form that *R* satisfies (1NF, 2NF, 3NF, or

BCNF). (c) If *R* is not in BCNF, decompose it into a set of BCNF relations that preserve the

dependencies.

a) *B → C, D → A*

b) *ABC → D, D → A*