**Course Code: IS212**

**Course Name: Database**

**2nd year**

**Faculty of Computer and Information**

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**Sheet 6 - (Normalization) –**

**1- Consider the following relations for an order-processing application database at ABC, Inc.**

ORDER (O#, Odate, Cust#, Total\_amount)

ORDER\_ITEM(O#, I#, Qty\_ordered, Total\_price, Discount%)

Assume that each item has a different discount. The Total\_pricerefers to oneitem, Odate is the date on which the order was placed, and the Total\_amount is theamount of the order. If we apply a natural join on the relations ORDER-ITEM andORDER in this database, what does the resulting relation schema look like? Whatwill be its key? Show the FDs in this resulting relation. Is it in 2NF? Is it in 3NF? Why or why not? (State assumptions, if you make any.)

**2- Consider the following relation:**

CAR\_SALE(Car#, Date\_sold, Salesman#, Commission%, Discount\_amt)

Assume that a car may be sold by multiple salesmen, and hence {CAR#, SALESMAN#}is the primary key. Additional dependencies are:

Date\_sold->Discount\_amtand

Salesman# -> Commission%

Based on the given primary key, is this relation in INF, 2NF, or 3NF? Why or whynot? How would you successively normalize it completely?

**3-Consider the following relation for published books:**

BOOK (Book\_title, Author\_name, Book\_tvpe, List\_price, Author\_affil, Publisher)

Author\_affil refers to the affiliation of author. Suppose the following dependenciesexist:

Book\_title-> Publisher, Book\_type

Book\_type->Listprice

Author\_name-> Author-affil

a. What normal form is the relation in? Explain your answer.

b. Apply normalization until you cannot decompose the relations further. Statethe reasons behind each decomposition.