

Q1. Consider a relation with (emp id, speciality and manager id). The following business rules hold for the above relation.

- (i) employee may have many specifications
- (ii) each speciality has many managers
- (iii) employee has only one manager for each speciality
- (iv) each manager has only one speciality.

Find out the normal form of the above relation

**(Note:** First find functional dependencies)

- (a) 1NF
- (b) 2NF
- (c) 3NF
- (d) BCNF

Q 1 → R(E-ID, specialty, M-ID)

- (1) Emp. may have many specifications
- (II) each specialty many many managers
- (III) Emp. has only one manager -  
for each spec'
- (IV) each manager has only one specification

Find "Hannal Farm"

Sel<sup>n</sup>

emp, sp → manager ID

M-ID → sp

(3) 3NF

02. A relation  $R(ABCD)$  is in 3NF but not in BCNF. Which of the following dependency set is suitable for above statement?

- (a)  $\{AB \rightarrow CD, A \rightarrow C, D \rightarrow B\}$
- (b)  $\{AB \rightarrow CD, C \rightarrow DA\}$
- (c)  $\{A \rightarrow BCD, B \rightarrow CD, C \rightarrow D\}$
- (d)  $\{AB \rightarrow CD, C \rightarrow A, D \rightarrow B\}$

(c) 2-3  $R(ABCD)$   $\rightarrow$  3NF ✓  
 ~~$\rightarrow$~~  BCNF X

A)  $AB \rightarrow CD, A \rightarrow C, D \rightarrow B$  — 1NF

B)  $AB \rightarrow CD, C \rightarrow DA$   $\rightarrow$  2NF

C)  $A \rightarrow BCD, B \rightarrow CD, C \rightarrow D$   $\rightarrow$  2NF

~~D)~~  $AB \rightarrow CD, C \rightarrow A, D \rightarrow B$   $\rightarrow$  3NF

03. Consider a relation  $R(ABCDE)$  with the following dependency sets. Which of the below alternative can be decomposed in to BCNF without violating dependency preservation?

- (a)  $\{ABC \rightarrow DE, DE \rightarrow C\}$
- (b)  $\{AB \rightarrow C, ABD \rightarrow E, E \rightarrow D\}$
- (c)  $\{ABC \rightarrow DE, D \rightarrow B, E \rightarrow C\}$
- (d)  $\{ABC \rightarrow DE, D \rightarrow EA, A \rightarrow D\}$

~~(d) ③  $\Rightarrow R(ABcDE) \rightarrow BCNF$~~

~~(d)~~  $ABc \rightarrow DE, D \rightarrow EA, A \rightarrow D$

$\Rightarrow BCNF$

04. A relation R (ABCDEF) with fd set  
 $F = \{AB \rightarrow CDE, CD \rightarrow E, E \rightarrow C\}$ . Which of the following statement is false?
- (a) The above relation can be decomposed into 2NF with dependency preservation.
  - (b) The above relation can be decomposed into 3NF with dependency preservation.
  - (c) The above relation can be decomposed into BCNF with dependency preservation.
  - (d) All of the above

false

⑥ ~~Q3~~

$R(ABCD.EF)$

$$F = \{ AB \rightarrow CDE, CD \rightarrow E, E \rightarrow F \}$$

$R_1(ABCD)$        $R_2(CDEF)$

3NF

(b)

Above relation can be decomposed into  
3NF & dependency present

05. Consider the relation

$R = \{A, B, C, D, E, F, G, H, I, J\}$  and set of FDs are  
 $F = A, B \rightarrow C, A \rightarrow D, E, B \rightarrow F, F \rightarrow G, H, D \rightarrow I, J$ ,  
if we decompose  $R$  into 3NF, then possible  
tables are

- (a)  $\{D, I, J\}, \{A, D, E\}, \{F, G, H\}, \{B, F\}, \{A, B, C\}$
- (b)  $\{D, I, J\}, \{A, C, E\}, \{F, G, H\}, \{B, F\}, \{A, D, C\}$
- (c)  $\{F, G, H\} \{D, I, J\}, \{A, D, E, B, F\}, \{A, B, C\}$
- (d) None of the above

(@) S3  $R(A B C D E F G H I J)$   
 $F = AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ$

3NF possible tables

$\overbrace{AB}^F = ABCDEF GHIJ$   
 $\overbrace{SC.R}$

(@) (DZJ), (ADE), (FGH), (BF), (ABC)

Teacher's Signature .....

06. Consider a relation  $R(ABCDEFG)$  with the following functional dependency Set  $F = \{AB \rightarrow CDEF, C \rightarrow ADE, D \rightarrow EBF, F \rightarrow BA, BE \rightarrow AF\}$

Find out the normal form of above table

- (a) 1NF
- (b) 2NF
- (c) 3NF
- (d) BCNF

④ 6 ⇒

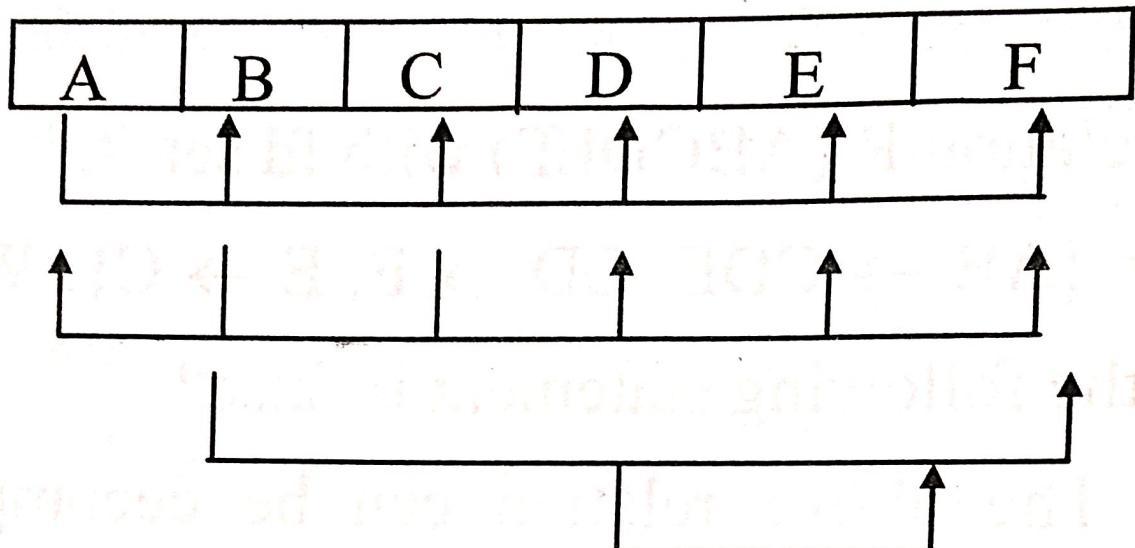
$R(A \text{ } B \text{ } C \text{ } D \text{ } E \text{ } F \text{ } G)$

$F = AB \rightarrow CDFF, C \rightarrow ADF, D \rightarrow EBF$   
 $\neg F \rightarrow BA, BF \rightarrow AD$

(d)

BCNF

07. The best normal form for the instance is



(a) 1NF

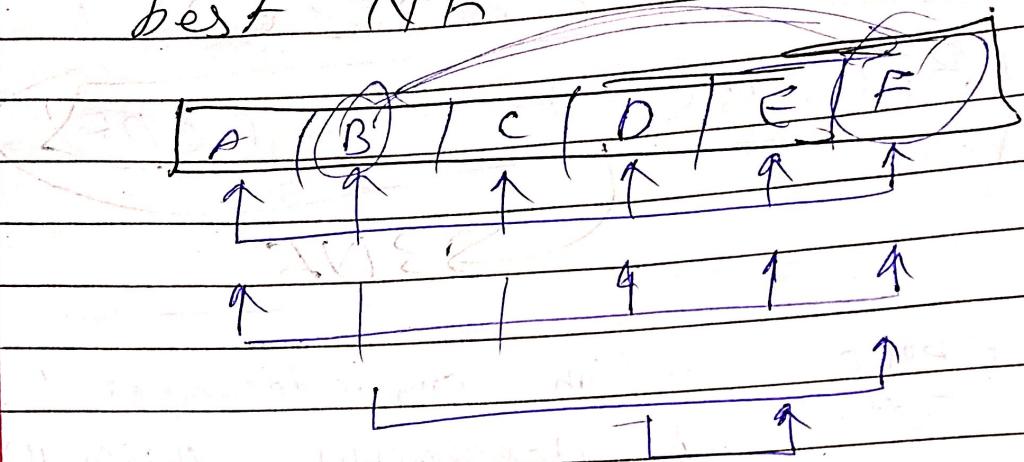
(b) 2NF

(c) 3NF

(d) BCNF

① 738

best N5



Relation consider PFD:  $B \rightarrow^4 F$

①

$LNF$

08. R(ABCDE) and the set of Fds on R given by

$$F = \{AB \rightarrow CD, ABC \rightarrow E, C \rightarrow E\}.$$

What is the normal form of R?

- (a) 1NF
- (b) 2NF
- (c) 3NF
- (d) BCNF

(b) 8]  $R(A B C D E)$   
 $F = A B \rightarrow C D, A B C \rightarrow E, C \rightarrow E$

Relation contain TD  $\rightarrow C \rightarrow E$

(b) 2NF

**09. A Relation R is in 3NF but not in BCNF.**

Which of the following is a false statement?

- (a) The relation R will have insertion anamoly
- (b) The relation R may have updation anamoly
- (c) The relation R may have deletion anamoly
- (d) The relation R will not have data redundancy.

①  $\Rightarrow$  R is in 3NF. not BCNF.  
which False,

A relation R in 3NF but not BCNF have the problem of prime transitivity & have insertion, updation & deletion anomalies.

(d) The relation R will not have data redundancy,

**10. Assertion[a]:** A relation  $R(ABCDE)$  with FD set  $F = \{A \rightarrow B, B \rightarrow C, D \rightarrow E, C \rightarrow D, C \rightarrow A\}$  is decomposed into BCNF as  $R_1(ABCD)$  and  $R_2(DE)$ .

**Reason[r]:**  $R_1(ABCD)$  is in BCNF and  $R_2(DE)$  is in BCNF.

### **Choose:**

- (a) Both (a) and (r) are true and (r) is the correct reason for (a).
- (b) Both (a) and (r) are true but (r) is not the correct reason for (a).
- (c) Both (a) and (r) are false.
- (d) (a) is true but (r) is false.

- ~~(a)~~  ~~$R_1$~~  (a)  $R_1(ABCDE)$  is in BCNF  
 $A \rightarrow B, B \rightarrow C, D \rightarrow E, C \rightarrow D$ ,  
 $C \rightarrow A$ ,  
 $B \in NF$  as  $R_1(A \oplus CD) \rightarrow R_2(DEF)$
- ~~(b)~~  $R_1(ABCD)$  is in BCNF &  
 $R_2(DEF)$  is in BCNF.
- ~~(a)~~ both correct  
~~(a)~~ is correct reason for (a)