

Database Systems (CS2005)

Sessional-II Exam

Date: Fri, 05 April 2024

Course Instructor(s)

Total Time (Hrs.): 1

Total Marks: 25

Total Questions: 5

2505

Roll No

SE4A

Section

TIR

Student Signature

Do not write below this line.

Note: Please ensure that you attempt all questions and their respective parts in the given order.

CLO # 3

Q. No 1: Consider a relation R (A, B, C, D, E, F), with the set of FDs $F = \{AB \rightarrow C, CD \rightarrow E, EF \rightarrow A, BC \rightarrow D, DE \rightarrow F\}$. Find all possible keys (i.e. candidate keys) of this relation? Prove it. [5]

CLO # 3

Q. No 2: Consider the relation schema R (A, B, C, D, E), with FDs $F = \{A \rightarrow BC, BCD \rightarrow E, BC \rightarrow D, A \rightarrow D\}$. Find a minimal cover of F (i.e. F_c). [5]

CLO # 3

Q. No 3: Consider two sets of FDs, F and G, $F = \{A \rightarrow BC, B \rightarrow D, C \rightarrow E, D \rightarrow E\}$ and $G = \{A \rightarrow BC, B \rightarrow D, C \rightarrow E, BD \rightarrow E, A \rightarrow D\}$. Are F and G equivalent? Prove it. [5]

CLO # 3

Q. No 4: Consider the relation R (A, B, C, D, E), with FDs $\{AC \rightarrow B, D \rightarrow E\}$. State which of the following decompositions of R relation are lossless decomposition. Prove it. [5]

- $R_1(A, C, D)$, $R_2(A, B, C)$, and $R_3(D, E)$.
- $R_1(A, B, D)$, $R_2(A, B, C)$, and $R_3(D, E)$.

CLO # 3

Q. No 5: Consider the relation schema R (A, B, C, D, E), with FDs $F = \{AB \rightarrow C, BC \rightarrow D, D \rightarrow E, AE \rightarrow B\}$. Keys of this relation are AB, AD, and AE. Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF). Justify your answer. If R is not in BCNF, decompose it into a set of BCNF relations and show your steps. Indicate which dependencies if any are not preserved by the BCNF decomposition. [5]