CS315: Principles of Database Systems, IIT Kanpur		Quiz II	(25 Oct 2024)	
Name				20 marks
Roll No	Dept.			Page 1 of 2

Instructions:

- 1. This question paper contains 1 page (2 sides of paper). Please verify.
- 2. Write your name, roll number, department above in **block letters neatly with ink**.
- 3. Write your final answers neatly with a blue/black pen. Pencil marks may get smudged.
- 4. Don't overwrite/scratch answers, no hardcoding allowed ambiguous cases may get 0 marks.

Q1. The tables p and q share a schema (both have two columns, named A, B), and have m, n rows respectively with m < n. Neither table has any duplicate rows. Find out the minimum, maximum sizes (in terms of m, n) of the tables resulting from the following operations? Justify your answers. Suboptimal answers will get no credit. (4 + 4 = 8 marks)

$p\Join q$ (natural join)	Minimum size	Maximum size
Give justification here $\mathcal{P} \cup \mathcal{Q}$ (union) Give justification here	Minimum size	Maximum size
Q2. Given a table tbl (A INT Deebo wants to write a condition kind given on the right) to prin cute and NO otherwise. Deeb that column contains no NUL	EGER, B INTEGER), onal SQLite query (of the ot YES if the column A is o calls a column cute if L values and moreover.	SELECT CASE WHEN [Boolean expression] THEN 'YES' ELSE 'NO'

END;

are candidate keys). Complete the query by giving the Boolean expression for the YES case. Give only the Boolean expression and not the entire query. *Hint: put parenthesis around statements if* comparing their results. Note: We will type your answers as SQLite queries to actual DBs to give marks. If your query takes excessively long to execute, it will get a default zero score. (6 marks)

that column has unique values in all rows (cute columns

Q3. Fill exactly one box on the right and give brief justification. (2 x (1+2) = 6 marks)
For a schema R with $R', R'' \subseteq R$ being subsets of the columns, the dependency $R' \rightarrow R''$ is known to hold. For which columns $C \in R$ does $R'C \rightarrow R''$ hold true? $(R'C \equiv R' \cup \{C\}$ and <i>iff</i> means if-and-only-if). Justify using Armstrong's axioms.
Give justification here
The schema $R(A, B, C, D, E)$ has 3 dependencies $AB \rightarrow C, CD \rightarrow E$ and $DE \rightarrow B$. Is AB a candidate key for this schema? Is ABD a candidate ABD but not AB
key? Justify by applying the algorithm for finding attribute set closure. Both <i>AB</i> , <i>ABD</i>
Give justification here