1. Describe the main features of NewSQL systems.

In general, NewSQL systems are designed to combine the uses of traditional databases with the scalability of NoSQL databases

* ACID Compliance, traditional databases
* Horizontal Scalability, can scale in a variety of ways like atomicity and durability
* Distributed Architecture, distributed across multiple nodes to handle increasing workloads
* SQL Support – They use SQL as their query language easier for relational DB’s.

1. A real-world application where NewSQL might outperform NoSQL is in scenarios requiring highly complex transactions and high scalability, like economic instruments and institutions. NewSQL can handle most of these requirements while making sure data is secure and data integrity is maintained.
2. Data consistency refers to the accuracy, reliability, and uniformity of data across a dataset, these type include, semantic inconsistency, syntactic inconsistency and coverage inconsistency.
3. The entity resolution problem involves identifying and linking different representations of the same real-world entity in a dataset. An example would be like a customer/consumer DB. Resolving these entities is crucial for maintaining data and accuracy.

5.

The FD 𝑅1[𝐴] → 𝑅1[𝐵] suggests that values in column B are functionally dependent on column A in table R1.

The IND 𝑅2[𝐵] ⊆ 𝑅1[𝐵] indicates that the values in column B of table R2 are included in the values of column B in table R1.

Since there's no contradiction or conflict between these dependencies, the set is consistent.

B.

For table D(R1): {(1,2), (1, 3)}, and D(R2): {(2, 1), (3, 4)}, a constraint-by-constraint repair may not terminate because fixing one constraint might introduce violations in another. In this case:

If you try to fix the FD 𝑅1[𝐴] → 𝑅1[𝐵] by altering data in R1, it might conflict with the IND 𝑅2[𝐵] ⊆ 𝑅1[𝐵].

Adjusting the IND to satisfy the FD could create issues with the existing data.