Question 1. Consider the following ER (Entity-Relationship) diagram:

NOTE: J is a multi-value attribute (i.e., list type); A, C, and E are the primary keys of E1, E2, and E3, respectively.

Functional Dependencies:
- F → G
- G → H

Convert the ER diagram into a normalized relational database schema. For each relation schema, give the primary key, candidate key(s), foreign key(s), and functional dependencies. All relations must be in BCNF.
Question 2.

2.1: Explain the difference between SQL “Constraint” and SQL “Trigger”

2.2: Consider the following ER-Diagram:

1) Construct relation schemas and specify the primary keys and the foreign keys. For each foreign key, specify the referenced table. You can rename the attributes. The attribute names of a foreign key and those of the targeted primary key need not be the same.

2) Assume that integer is the domain (data) type of all attributes. Define the relations using the create table SQL command.
**Question 3.** Consider the following database and query:

Relations: T1(a, b, c, d), T2(e, f, g)
Functional Dependencies: F1={ad→bc}, F2={e→fg}
T1.b is a foreign key referencing T2

Select T1.a, T2.b
From T1, T2
Where T1.b = T2.e and
    T2.f > 10 and T2.f < 20 and
    T2.ac = 5;

Optimize this query by creating index structures.
Use the SQL command “create index ~”.

END