Exam possibilities and notes

This year we covered:

1. Queries and views using:
    a. Set operators (UNION, EXCEPT, INTERSECT), aggregation, different types of join.
    b. Correlated sub-queries
        i. A query is correlated if the inner query cannot run on its own.
    c. Templates for advanced queries
        i. See week 2, run crisps template.
2. Programming:
    a. Understand the concepts of having a limited amount of storage and that the program cannot see the contents of the database. Data can only be retrieved by using a SELECT statement, and SELECT … INTO allows the program to store data in local storage.
    b. Practice programming. Note: Functions, and procedures could appear on the paper, but no Python will be required. Could be a bit of theory on why functions are required. SQL injection?
3. Normalization:
    a. How do we do it?
    b. Why do we do it?
    c. What are the advantages / disadvantages of a normalized set of tables over an unnormalized document?
        i. Know how to count rows and to find candidate primary keys.
4. Triggers:
    a. Call a function you have written in PLpgSQL.
    b. Write a trigger to audit INSERT/UPDATE/DELETE actions.
    c. Write a trigger to prevent an action from taking place.
        i. Know how to write a trigger and how they work.
5. Concurrency
    a. What is the principle of least privilege? Understand GRANTs and how they work.
    b. Know that an INSERT/ UPDATE/ DELETE statement locks any row it uses.
    c. Understand COMMIT and ROLLBACK.
    d. What is a two-phase commit?
    e. What is the CAP theorem?
    f. How does a relational database compare with a NoSQL database?
6. MongoDB
    a. Explain the concepts of MongoDB – Availability, no schema, Database, Collection, Document.
    b. Compare and contrast with Relational. Know about big data and ethics.
    c. What is the difference between flat documents with no relationships, 1:few relationships, 1:many, 1:squillions?
    d. What validation can be placed on a MongoDB collection and how is it done?
    e. Know how to add documents to a MongoDB collection.
7. Tidy data
    a. What is tidy data?
    b. When does data need to be tidy?
    c. What are the pitfalls when tidying data?

d. In what way can techniques used in SQL transfer to other languages?