Part 1 (5 marks): Semi Structured Data - Object Exchange Model

1. From a database perspective the Web has generated an enormous demand for recently developed database architectures for database integration such as data warehouses and mediation systems.

2. Data guide is a concise and accurate summary of a data graph.

3. Data guide is the most specific schema graph for a given data graph.

4. There is a simulation from the data guide to every other schema graph the data graph satisfies.

5. What a schema graph is useful for:
   - browsing the data by types
   - optimizing queries by reducing the number of paths searched
   - improving storage of data

Part 2 (5 marks): Introducing XML

1. XML defines a generic syntax used to mark up data with:
   - simple tags
   - complex tags
   - human-readable tags
   - technical tags

2. The XML specification defines a grammar for XML documents that says:
   - where tags may be placed
   - which tags may be placed
   - how attributes are attached to elements
   - how attributes are nested within other attributes

3. What’s the main advantage of XML applications?
   Interoperability

4. What are the features making Java and XML very complementary?
   Java promised portable code; XML delivers portable data.

5. Which problems do XML encryption and XML Signature address?
   XML encryption addresses the need for confidentiality.
   XML Signature addresses the problem of authentication.
Part 3 (5 marks): XML fundamentals

1. How do you do to make everything in a part of an XML file is simply character data, not markup?
   - A CDATA section

2. Comments are intended for computer programs.
   - True
   - False

3. It is recommended to write XML documents that depend on the contents of comments being available.
   - True
   - False

4. If an XML document does have an XML declaration, then that declaration must be the first thing in the document.
   - True
   - False

5. Almost any document automatically generated will contain well-formedness mistakes.
   - True
   - False

Part 4 (5 marks): XML Schema (DTD)

Model the DTD for the following XML document

```xml
<?xml version="1.0" standalone="no"?>
<!DOCTYPE people SYSTEM "http://www.cafeconleche.org/dtds/person.dtd">
<people>
  <person person_id ="100" born="1912" died="1954">
    <name first_name = "Alan" last_name= "Turing"/>
    <professions>
      <profession>computer scientist</profession>
      <profession>mathematician</profession>
      <profession>cryptographer</profession>
    </professions>
    <image source="bus.jpg" width="152" height="345" alt="Alan Turing standing in front of a bus"/>
  </person>
  <person person_id ="200" born="1918">
    <name first_name ="Richard" last_name="Feynman" middle = "P" />
    <professions>
      <profession>physist</profession>
    </professions>
  </person>
</people>
```

```xml
<!ELEMENT people (person*)>
<!ELEMENT person (name, professions, image?)>
<!ELEMENT professions (profession*)>
<!ELEMENT profession (#PCDATA)>
<!ELEMENT name EMPTY>
<!ELEMENT image EMPTY>
<!ATTLIST person  born CDATA #REQUIRED died CDATA #IMPLIED person_id ID #REQUIRED>
<!ATTLIST name  first_name CDATA #REQUIRED  middle_initial CDATA #IMPLIED last_name ID #REQUIRED>
<!ATTLIST image  source CDATA #IMPLIED>
```