

**University of Cape Town**  
**Department of Computer Science**  
**CSC3002f Final Exam**  
**2007**

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**Marks** : 100

**Time** : 180 minutes

**Instructions:**

- Show all calculations where applicable.
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**SECTION A : ANSWER ALL QUESTIONS**

**Question 1: XML and Web Services [8]**

- a) Name one advantage and one disadvantage in using XML to represent semi-structured data. [2]
- b) XML is arguably a generic information encoding. Explain what facilities it offers to solve each of the following problems:
- i) Languages around the world cannot be represented with ASCII. [1]
  - ii) Fields may have different meanings in different contexts. [1]
  - iii) XML assigns special meaning to some characters (e.g., <) so they cannot be used in documents. [1]
- c) The Web Services architecture for distributed computing uses XML as the basis for standards that describe its key components. Explain what the purpose of each of the following standards is:
- i) SOAP [1]
  - ii) WSDL [1]
  - iii) UDDI [1]

**SECTION B : ANSWER QUESTION 2 or QUESTION 3**

**Question 2: XML [7]**

- a. What is the purpose of XML Schema? [1]
- b. How is an XML document or document fragment associated with its XML Schema? [2]
- c. Write an XML Schema complexType type definition **notebooksType** corresponding to the content of the **notebooks** element and its descendents. Assume that the **researcher** element will occur exactly once and that the **book** element must occur at least once. [4]

```
<notebooks xmlns="http://bleek">
  <researcher>Wilhelm Bleek</researcher>
  <book>BC1</book>
```

```
<book>BC2</book>
</notebooks>
```

## Question 2: XML [7]

- a. What is XSLT? [1]
- b. What is XSL-FO? [1]
- c. Write an XSLT template to convert the **notebooks** node into the **academic** subtree. Assume that the **name** element will occur exactly once and that the **book** element must occur at least once. [5]

```
<notebooks xmlns="http://bleek">
  <researcher>Wilhelm Bleek</researcher>
  <book>BC1</book>
  <book>BC2</book>
</notebooks>

<academic xmlns="http://bleek2">
  <name>Wilhelm Bleek</name>
  <book>BC1</book>
  <book>BC2</book>
</academic>
```

Assume your template will be placed within the following stylesheet:

```
<xsl:stylesheet version="1.0"
  xmlns:xsl=http://www.w3.org/1999/XSL/Transform
  xmlns:source="http://bleek"
  xmlns:target="http://bleek2">
  ...
</xsl:stylesheet>
```