

**University of Cape Town**  
**Department of Computer Science**  
**CSC3002f Supplementary 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) What is the difference between well-formedness and validity? [2]
- b) Explain how some Unicode encodings are optimised for languages such as English. [2]
- c) Well-formed UTF-8-encoded XML may be parsed by either a SAX or DOM parser. Under what circumstances would a SAX parser be the one of choice? [1]
- d) 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. Which Web Service standard relies most upon XML Schema? [1]
- b. Describe 2 purposes that XML Schema can serve when creating Web Services. [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 the **office** attribute is required.. [4]

```
<notebooks xmlns="http://bleek">  
  <researcher office="111">Bleek</researcher>  
</notebooks>
```

**Question 2: XML [7]**

- a. If an XSLT engine CANNOT match the root node, what does it do? [1]

- b. If an XSLT engine CAN match the root node, what does it do? [2]
- c. Write an XSLT template to convert the **notebooks** node into the **academic** subtree. Assume that the **researcher** element will occur exactly once and that the **office** attribute is required. [4]

```
<notebooks xmlns="http://bleek">
  <researcher office="111">Bleek</researcher>
</notebooks>

<academic xmlns="http://bleek2">
  <name>Wilhelm Bleek</name>
  <office>111</office>
</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>
```