



**UNIVERSITY OF COLOMBO, SRI LANKA**

**UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING**

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)**  
**Academic Year 2010/2011 – 3rd Year Examination – Semester 5**

***IT5403: Internet Application Development***  
***Structured Question Paper with Model Answers***

**13<sup>th</sup> March 2011**  
**(TWO HOURS)**

**To be completed by the candidate**

BIT Examination Index No:

**Important Instructions:**

- The duration of the paper is **2 (Two) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **15 pages**.
- **Answer all 4 questions: Each question carries 25 marks.**
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.  
If a page is not printed, please inform the supervisor immediately.

**Questions Answered**

Indicate by a cross (×), (e.g. 

×
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) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	1	2	3	4
To be completed by the examiners:				

- 1) (a) Explain the similarities and differences between XML and HTML.

(5 marks)

**ANSWER IN THIS BOX****Similarities:**

XML and HTML can be used to create web pages.

Both are markup languages.

**Differences:**

HTML is a formatting and display language for web pages.

XML was designed to carry data, not to display data.

- (b) Is the following XML document “well formed”, justify your answer using line numbers if necessary.

1. <?xml version="1.0"?>
2. <address>
3.     <name>nimal</name>
4.     <NO/>24
5.     <street>1st lane</street>
6.     <city>Colombo</city>
7.     <country/>sri lanka </country>
8. </address>

(5 marks)

**ANSWER IN THIS BOX****No, because****In line 4, element NO is an empty element. After that it is text data. It is ok.****In line 7, element country is not an empty element. Therefore the start tag should be <country>.**

(c) Explain the correctness or otherwise of the following statement.

*“XML is entirely about web pages and cannot be used to represent information other than about web pages on a computer.”*

(5 marks)

**ANSWER IN THIS BOX**

**No. This statement is incorrect. XML is not entirely about web pages and can be used to represent any kind of information on any kind of computer.**

(d) One of the main benefits of XML is the ability to develop XML documents once and then have them viewable on a range of devices, such as desktop computers, handheld computers, mobile phones, and Internet appliances. Explain how/why this is possible.

(5 marks)

**ANSWER IN THIS BOX**

**XML is just plain text. Any device which can process plain text can process an XML document. So this is possible.**

- (e) One of the main goals of XML is to separate the meaning of information from its presentation. Explain how this is achieved in XML.

(5 marks)

**ANSWER IN THIS BOX**

XML document only defines the text content. To apply the presentation, use CSS or XSLT separately.

- 2) (a) Explain the effect of the following two XML statements and in which contexts they could occur.

1. `<gender type="male"></gender>`
2. `<gender type="male" />`

(5 marks)

**ANSWER IN THIS BOX**

Both are correct representations of an Empty Element. They both represent empty elements with attribute 'type' and value 'male'. They could occur in an XML document intended to default the gender to "male" if not stated.

- (b) Write a complete XML file which contains the following XML code with / including an Internal DTD, corresponding to the code.

```
<school>
  <name>abc</name>
  <br/>
  <no>24</no>
  <street>1st lane</street>
  <city>Colombo</city>
  <country>sri lanka</country>
</school >
```

(5 marks)

**ANSWER IN THIS BOX**

```
<?xml version="1.0"?>
<!DOCTYPE school [
  <!ELEMENT school (name,no,street,city,country)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT br EMPTY>
  <!ELEMENT no (#PCDATA)>
  <!ELEMENT street (#PCDATA)>
  <!ELEMENT city (#PCDATA)>
  <!ELEMENT country (#PCDATA)>
]>
<school>
  <name>abc</name>
  <no>24</no>
  <street>1st lane</street>
  <city>Colombo</city>
  <country>sri lanka</country>
</ school >
```

- (c) If a child element "street" must occur at least once or more times inside an "address" element, write the DTD code to enforce this constraint. (i.e. declaring a minimum of one occurrence of an element).

(5 marks)

**ANSWER IN THIS BOX**

<!ELEMENT address (street+)>

- (d) Explain what the following DTD code means.

<!ELEMENT address (#PCDATA|name|street|city|country)\*>

(5 marks)

**ANSWER IN THIS BOX**

The above code declares that the "address" element can contain zero or more occurrences of parsed character data, "name", "street", "city", or "country" elements.

- (e) I). What does the following DTD code mean? What does “99” mean in this code?

```
<!ELEMENT tank EMPTY>
```

```
<!ATTLIST tank volume CDATA "99">
```

- II). Is the following XML code valid according to the above DTD? Explain your answer.

```
<tank volume="150" />
```

(5 marks)

**ANSWER IN THIS BOX**

I). In the above code, the "tank" element is defined to be an empty element with a "volume" attribute of type CDATA. If no “volume” is specified, it has a default value of 99.

II). Yes it is valid. The volume does not use the default value; instead a value of 150 is given.

- 3) (a) Is the final meaning of the following two XML code samples the same or do they give two different meanings? Justify your answer.

code sample 1

```
<x:Chart xmlns:x="http://www.definitions.org/">
  <x:Value>88</x:Value>
</x:Chart>
```

code sample 2

```
<Chart xmlns="http://www.definitions.org/">
  <Value>88</Value>
</Chart>
```

(5 marks)

**ANSWER IN THIS BOX**

**Code sample 1 is equivalent to the code sample 2. Code sample 2 uses a default namespace instead of the prefix "x".**



(b) What is XQuery used for? How is XQuery related to XPath?

(5 marks)

**ANSWER IN THIS BOX**

XQuery was designed to query XML data. XQuery is a powerful and convenient language designed for processing XML data. That means not only files in XML format, but also other data including databases.

XQuery is built on XPath expressions.

(c) Explain the correctness or otherwise of the following statement. Explain your answer.

*“A tree-based XML parser is preferable for large files than an event-based XML Parser”*

(5 marks)

**ANSWER IN THIS BOX**

No, the statement is not correct.

An event-based XML parser is preferable for large files, because tree-based parsers must fully load the file into memory in order to parse the XML.


(d) I). What are the main methods of a tree-based XML parser?

II). What are the main events of an event-based XML parser?

(5 marks)

**ANSWER IN THIS BOX**

I). `getRootElement()`, `getFirstChild()`, `getNextChild()`, `getLastChild()`

II). `startDocument()`, `startElement()`, `characters()`, `endElement()`, `endDocument()`

(e) What is the relationship between a SOAP based Web Service and a HTTP Web Server?

(5 marks)

**ANSWER IN THIS BOX**

A HTTP Web Server can be used to host a SOAP based Web Service. The HTTP Web Server acts as the Server software and the SOAP based Web Service will provide the necessary business function.

4) (a) How do SAX and DOM relate to a SOAP based Web Service?

(5 marks)

**ANSWER IN THIS BOX**

In a SOAP based Web Service the message is in XML format. To parse the XML message, one could use a SAX parser or a DOM parser.


- (b) Unlike traditional client/server models, such as a Web server/Web page system, Web services do not provide the user with a GUI. Explain why this is so.

(5 marks)

**ANSWER IN THIS BOX**

Unlike traditional client/server models, such as a Web server/Web page system, Web services do not provide the user with a GUI.

Web services instead share business logic, data and processes through a programmatic interface across a network.

The applications interface, not the users

Developers can then add the Web service to a GUI (such as a Web page or an executable program) to offer specific functionality to users..



- (c) List two other approaches/technologies which provide similar functionality to web services.

(5 marks)

<b><u>ANSWER IN THIS BOX</u></b>
Any two of the following:
Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA)
Microsoft's Distributed Component Object Model (DCOM)
Sun Microsystems's Java/Remote Method Invocation (RMI).

(d) Explain the purposes of the following technologies with respect to Web Services.

UDDI

SOAP

WSDL

(5 marks)

**ANSWER IN THIS BOX**

**UDDI – To discover the web service**

**SOAP – The Web Service messaging format**

**WSDL – To describe the Web Service**

(e) Explain the correctness or otherwise of the following statement.

*“The SOAP message is transferred in the HTTP Header section”*

(5 marks)

**ANSWER IN THIS BOX**

**Incorrect, the SOAP message is transferred in the HTTP Body section. HTTP Header section has utility information.**

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