

**BCS THE CHARTERED INSTITUTE FOR IT**

BCS HIGHER EDUCATION QUALIFICATIONS  
BCS Level 6 Professional Graduate Diploma in IT

**WEB ENGINEERING**

Thursday 24th April 2025 - Afternoon

Answer **any** THREE questions out of FIVE. All questions carry equal marks.

Time: THREE hours

**Answer any Section A questions you attempt in Answer Book A**

**Answer any Section B questions you attempt in Answer Book B**

The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are <b>NOT</b> allowed in this examination.
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**Section A**  
**Answer Section A questions in Answer Book A**

**A1.**

- a) Explain what http and https mean at the start of a web address, including why each is used and how each is implemented.  
(6 marks)
- b) Assess **five** primary reasons why it is considered good practice only to view web pages starting with 'https:'  
(10 marks)
- c) Evaluate **three** additional steps that web users should take to ensure that they are accessing a legitimate site whose address starts with 'https:'.  
(9 marks)

**A2.**

- a) Explain what is meant by the following acronyms giving examples of when you would use **each**.
- i. DTD
  - ii. CGI
  - iii. XSLT
  - iv. CSS
- (8 marks)
- b) Explain what is meant by the following, providing an example of the typical use of **each**.
- i. Single-factor authentication (SFA)
  - ii. Two-factor authentication (2FA)
- (8 marks)
- c) Evaluate **three** ways of implementing 2FA, demonstrating how security is enhanced and risks mitigated.  
(9 marks)

**A3.**

- a) In ISO/IEC 25010, software quality is divided into eight broad categories. Describe **four** of them and explain why each is important in developing web applications. You should include at least one characteristic into which each chosen category is divided, with a suitable example to show its applicability.  
(16 marks)
- b) Assess the usefulness of ISO/IEC 25010 to software teams developing web applications and identify where it falls short of providing a complete solution.  
(9 marks)

**Section B**  
**Answer Section B questions in Answer Book B**

**B4.**

- a) "A well-formed XML document is not necessarily valid". Assess the correctness or otherwise of this statement. Support your answer with a suitable example. (5 marks)
- b) XML documents can be validated against DTDs or XML schema. Assess the benefits and drawbacks of each approach citing suitable examples of each. (10 marks)
- c) Happy Valley Holidays run several camping and caravan sites and they wish to develop a mobile application to advertise the holiday opportunities available. You have been asked to prepare a suitable external DTD to describe their current offerings.

You have been given the following specification with which to work. Write a suitable draft DTD called HappyValley.dtd which applies these rules:

- SiteList is a container of Site elements.
- The attribute Site\_Code is mandatory for each site.
- For each Site, exactly one Site\_name, Site\_url, one or more Contact and zero or more Accommodation\_type elements must be present.
- Site\_url must have a page attribute.
- For each Contact, there must be a Contact\_name, Contact\_phone, Contact\_email.
- For each Accommodation\_type, exactly one Accommodation\_name, Accommodation\_description and Accommodation\_fee, must be present (assume the fee remains the same for any dates booked and is per night). Earliest\_booking\_date and Last\_booking\_date are optional (if they are not present the accommodation is available for booking all year).
- The Contact\_name must include Title, Last\_name and phone. It may also include First\_name and email.

**(10 marks)**

**B5.**

Due to the growing interest in Artificial Intelligence (AI), there has been a surge in the use of web applications that use Large Language Models (LLMs).

- a) Assess **four** functionalities of an LLM and give an example of such a system, assessing its capabilities. (7 marks)
- b) Assess **three** uses of LLMs including the benefits or otherwise that each gives. (9 marks)
- c) Evaluate **three** ways the output from an LLM can be identified. (9 marks)

**END OF EXAMINATION**