

BCS THE CHARTERED INSTITUTE FOR IT

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

WEB ENGINEERING

Thursday 23rd April 2026 – 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 NOT allowed in this examination.

Section A
Answer Section A questions in Answer Book A

A1.

The Northern Moors National Park runs a cycle hire facility for visitors. Cycles can be hired from one of four centres and returned to it at the end of the hire period. There is a series of cycling routes that link the centres to each other. Currently, bookings are handled manually either in-person or over the telephone. The park wishes to develop an online system which allows visitors to book bicycles at any hire centre and return them at the end of the hire period to any hire centre. The online system should also provide the hirer with suggested routes for their journey using the available cycle routes.

You have been tasked with assessing possible technical options for delivering such a system.

- a) Assess the architecture of a suitable system, including the necessary components, how they link together and any connections needed to other external services.

(10 marks)

- b) Define the principal functional components of your proposed system, identifying their key features and their location within your architectural framework.

(15 marks)

A2.

- a) Discuss what differentiates a software library from a framework when developing a web application, giving examples of when it is appropriate to use each. Your answer should clearly identify at least **one** advantage and **one** disadvantage of **each**.

(10 marks)

- b) As a web engineer, identify at least **five** major challenges in the design and development of an academic publisher's open publication site:

Users can upload their papers to a central server where they can be reviewed by a number of reviewers appointed by an editor. Reviewers can accept, ask for revisions or reject them based on the majority view of the reviewers. Once the paper has been accepted, it can be retrieved via a web link or an API.

Initially, focus on three of the core services: the ability to upload (write) a paper to the server, the reviewing stage and the ability to query for a paper once accepted. Identify **five** challenges that must be addressed and for **each**, provide an outline solution including the technology to be used.

Your answer should be in the form of a slide presentation to the client (8 slides with bullet points). Marks will not be given for quoting stages of the Software Development Life Cycle (SDLC).

(15 marks)

A3.

- a) Discuss what is meant by authentication in web applications and describe **three** ways in which it can be achieved.
(10 marks)
- b) Evaluate the requirement for non-repudiation in an online banking application and assess **five** ways this can be achieved.
(15 marks)

[Turn Over]

Section B
Answer Section B questions in Answer Book B

B4.

- a) Assess **four** principal differences in assessing the quality of mobile applications compared to traditional web applications.

(12 marks)

- b) Assess the usefulness of ISO/IEC 25010 to software teams developing mobile applications and identify where it falls short of providing a complete solution.

(13 marks)

B5.

There has recently been considerable interest in the use of generative Artificial Intelligence (AI) to enhance the user experience in web applications.

- a) Briefly describe what is meant by generative AI.

(5 marks)

- b) Assess **five** ways it can be used beneficially in enhancing the user experience in web applications.

(10 marks)

- c) Evaluate **five** potential risks of inappropriate use.

(10 marks)

END OF EXAMINATION