BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SMART SYSTEMS

Friday 10th October 2025 – Afternoon

Answer **any** FOUR questions out of SIX. All questions carry equal marks.

Time: TWO hours

Answer any <u>Section A</u> questions you attempt in <u>Answer Book A</u>
Answer any <u>Section B</u> questions you attempt in <u>Answer Book B</u>

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.

a)
  i.   Describe the main principles of Artificial Intelligence (AI).

  (8 marks)

  ii. Describe the levels of AI.

  (3 marks)

  iii. Show how AI uses aspects of human intelligence to create intelligent systems.

  (3 marks)

b) Describe how the following technologies can be used in smart systems:

  i.   Big data
  ii. Data analytics
  iii. Data mining

  (9 marks)

c) Identify **four** smart systems applications involving the use of any of these technologies.

  (2 marks)

A2.

a) Explain the concept of distributed systems, providing examples, and discuss their primary purpose.

  (7 marks)

b) Describe **two** advantages of using distributed systems.

  (4 marks)

c)
  i.   Define blockchain, explain its purpose, and illustrate **two** benefits and **two** challenges associated with its use.

  (8 marks)

  ii. Discuss the role of blockchain as an enabling technology in smart systems.

  (6 marks)

A3.

a) Describe the ethical, social, and environmental considerations in the development of smart systems.

  (15 marks)

b) Identify the privacy and security concerns in smart systems. Discuss their sustainability, economic impacts, and relevant legal and application standards.

  (10 marks)

B4.

a)
  i. Explain the key differences between Operational Technology (OT) and Information Technology (IT) security.

      (10 marks)

  ii. Describe the purpose of OT and IT security in the context of Cyber-Physical Systems (CPS).

      (5 marks)

b) Describe **five** of the main security challenges faced by smart systems.

   (10 marks)

B5.

a) Describe sensors and actuators, showing how they differ, and how they collaborate in smart systems. Provide **three** examples for each.

   (10 marks)

b) Describe Cyber-Physical Systems (CPS) risk management, including its key elements and security concerns.

   (5 marks)

c) Maintaining security in CPS is a challenge. Identify **five** measures or actions that can be used to address the security issues.

   (10 marks)

B6.

a)
  i. Define the Internet of Things (IoT) and state **four** of its primary purposes in smart systems.

      (8 marks)

  ii. Describe **four** examples of IoT applications.

      (8 marks)

b)
  i. Describe what is meant by pervasive computing.

      (3 marks)

  ii. Identify the key principles of pervasive computing, illustrating your answer with examples of how it is used both in everyday life and smart systems.

      (6 marks)

END OF EXAMINATION