

BCS THE CHARTERED INSTITUTE FOR IT
BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SMART SYSTEMS

SAMPLE PAPER

Answer **any** FOUR questions out of SIX. All questions carry equal marks.
Time: TWO hours

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.

Smart Systems and Artificial Intelligence (AI) are terms that are widely used.

a) Define Smart Systems.

(5 marks)

b) AI attempts to mimic and model human Intelligence. Outline **TWO** approaches that can be used to achieve this and discuss the advantages **AND** disadvantages of **EACH** approach.

(10 marks)

c) Briefly discuss the difference between deep and shallow learning with regards to Artificial Neural Networks (ANN), and Deep Neural Networks (DNN), in order to learn effective representational patterns of data for the development of Smart Systems.

(10 marks)

A2.

Pervasive computing is one the main realisation enablers of smart systems and the Internet of Things (IoT).

a) Explain what pervasive (ubiquitous) computing is and how it is related to smart systems and in particular IoT.

(10 marks)

b) Identify and give a brief explanation of **THREE** enabling technologies (other than pervasive computing) that have an impact on IoT development and implementation.

(15 marks)

A3.

Applications of AI in business and industry, for example Data Mining, are increasingly being used.

a) Using **THREE** relevant examples to illustrate your answers, explain the differences between data mining and data analytics.

(15 marks)

b) Machine Learning is an enabling technology used in the development of Smart Systems. Define Machine Learning and explain its purpose.

(10 marks)

[Turn Over]

Section B
Answer Section B questions in Answer Book B

B4.

Cyber Physical Systems (CPS) play an important role in the development and implementation of Smart Systems.

a) Define Cyber Physical Systems and explain their purpose. **(10 marks)**

b) Identify **THREE** of the main challenges with Cyber Physical Systems, using relevant examples to illustrate your answers. **(15 marks)**

B5.

Smart Systems rely on several enabling technologies for their development and implementation and use.

a) Cloud technology is an essential enabling technology for Smart Systems. Define cloud technology and its purpose. **(9 marks)**

b) Discuss the advantages **AND** disadvantages of cloud technology when used in connection with Smart Systems, giving examples. **(16 marks)**

B6.

The domain of Smart Systems is becoming increasingly part of our daily lives.

a) Identify and discuss **THREE** examples of Smart Systems used in real life situations. **(15 marks)**

b) Using **TWO** of the examples from above, identify and discuss any risks and ethical implications that might occur with their use. **(10 marks)**

END OF EXAMINATION