BCS THE CHARTERED INSTITUTE FOR IT

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

IT AND THE ENVIRONMENT

Wednesday 27th September 2017 – Morning
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. An environmental charity is seeking ways in which it can monitor soil temperature across remote areas as part of a study into climate change. The areas do not have electricity or fixed telephone connections.

A suitable sensor and data storage device has been selected. You are asked to provide advice in gathering data remotely from field locations.

a) Outline the practical problems of collecting data from these remote areas.

(5 marks)

b) Describe THREE technologies you could employ to collect data from a hundred or more of these remote areas. **(12 marks)**

c) For ONE of these technologies, discuss how you could manage and store incoming data, evaluate it and make it widely available. **(8 marks)**

A2. As the IT service manager of a large manufacturing company in the UK, you are seeking to replace about 200 desktop PCs as part of an upgrade programme.

You wish to recycle the old PCs in the most effective way. Several organisations from different parts of the world have offered to collect them from you without cost (or payment) to the company.

a) Identify FIVE key questions which you would ask these organisations prior to choosing one of them as the recycler of your PCs. For each question, give your reasons for asking that question. **(15 marks)**

b) A document will be created, which the selected organisation must sign, detailing the way the recycling must be carried out and what UK laws must be observed by the organisation. Discuss which UK laws and regulations must be referred to in the document. **(10 marks)**

Section B
Answer Section B questions in Answer Book B

B3. In 1975, a city sited alongside a large river installed a flood warning system which is still in use.

The system is made up of twenty float level sensors located at 100m intervals along the river bank. These sensors are connected to an electrically powered bell; when any float rises above a preset level, it operates an electrical switch which makes the bell ring. On hearing the bell, the city police and others begin to raise flood barriers and open emergency shelters. The system gives approximately 30 minutes' warning of a flood. It has operated ten times since 2000, but it is now reaching the end of its useful life and needs to be replaced.

The city is taking the opportunity to develop a replacement system which will be more flexible and have a wider spread of sensors. It will also allow different kinds of alert to be generated.

a) Explain how a replacement system could use sensors and monitors connected to the Internet of Things (IoT). Your answer should show how using IoT sensors can provide more data. By reference to the types of sensors available, you should explain the opportunities to improve the data collection and reporting, and how the range and variety of this data is increased. **(13 marks)**

b) Identify THREE possible drawbacks of the IoT approach, and explain how they might be managed. **(12 marks)**

B4. A national government is developing its environmental policy in the areas of data centres and home working.

a) The government wishes to become a major host for international data centres. It wants to be sure that all data centres on its territory are operated with concern for the environment. To do this, they are considering applying the EU Code of Conduct for Data Centres.

What are the advantages and drawbacks of (i) making the code a legal requirement, and (ii) making it voluntary? In both cases you should explain how a data centre which does not follow the code would be treated. **(13 marks)**

b) The government also wishes to promote the use of home working / telecommuting among its own employees. Discuss TWO advantages and TWO drawbacks of home working / telecommuting. **(12 marks)**

B5. The residents of a tower block have decided to create their own environmentally friendly community. They plan to install wind and solar technology on the building. This will include a heat management system in which hot air from the sunny side of the building is transferred to the colder side. The plan also includes a water harvesting system where rain water and recycled waste water is used to flush toilets.

    a) Explain the IT systems which will be needed to operate the technologies in this tower block. Your answer should consider how the data is used.

        i. The energy collecting parts (wind and solar power).

        ii. The heat management system.

        iii. The water harvesting system.

(10 marks)

    b) The local power company wants to support this scheme and has proposed that they install smart electric and water meters for each apartment in the tower block.

        i) Discuss the advantages and disadvantages of this plan from the residents' view.

(9 marks)

        ii) Discuss opportunities for the power company to manage demand. **(6 marks)**