BCS THE CHARTERED INSTITUTE FOR IT

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

NETWORK INFORMATION SYSTEMS

Monday 19th March 2018 - 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.

For all questions illustrate your answers with diagrams where appropriate

Section A
Answer Section A questions in Answer Book A

A1

a) In the Open Systems Interconnection (OSI) seven layer model the first four layers are the physical layer, data link layer, network layer and transport layer.

Briefly describe each layer.

(8 marks)

b) For these four layers, and with reference to TCP/IP networks or another network technology with which you are familiar, identify one WAN or one LAN **wired** technology that operates at each layer.

(4 marks)

c) The terms “wireless access point” and “wireless router” are often used interchangeably but, in fact, describe different parts of the functionality of such wireless devices.

Describe, with the aid of diagrams where helpful, a WiFi device that acts as an access point for wireless devices on one interface and routes to the wired TCP/IP Internet on a second interface. Ensure that different TCP/IP networks are allocated to each interface. Include a description of where any routing occurs and the OSI layer at which it is being operated.

(9 marks)

d) Typically, wireless routers may include some application layer protocol support.

Describe one application layer service that may be supplied by a typical wireless router.

(4 marks)

A2

a) Describe what is meant by the term “flow control” in packet switched networks, and explain how the Transmission Control Protocol (TCP) implements flow control behaviour in cases of bulk transfer of data. You may find it helpful to use a diagram.

(9 marks)

b) Explain the key difference between flow control and congestion control, and describe the main TCP congestion control algorithm. You may find it helpful to use a diagram.

(9 marks)

c) The manager of a network that suffers from frequent congestion at a key router chooses to monitor the router using Simple Network Management Protocol (SNMP).

Describe SNMP and explain, in the context of this scenario, how the protocol can be used to monitor traffic at the router.

(7 marks)

A3

a) Define what is meant by packet switching, message switching and circuit switching in computer networks.

(9 marks)

b) Explain what is meant by a store-and-forward delay and explain why this might make message switched networks slower than packet switched networks.

(8 marks)

c) The Internet has become an everyday, global, packet switched network.

In this context, describe the advent of circuit emulation services and explain how these might be employed for the provision of voice services.

(8 marks)

Section B
Answer Section B questions in Answer Book B

B4

a) Explain the principles of Universal Description, Discovery and Integration (UDDI).

(5 marks)

b) Describe JavaScript Object Notation (JSON) and explain how it is used for the delivery of Web Services.

(5 marks)

c) Describe the key principles of Representational State Transfer (REST) and evaluate its effectiveness in an on-line ordering system.

(15 marks)

B5

a) Define the purpose of Service Oriented Architecture (SOA).

(3 marks)

b) With reference to SOA

(i) Discuss the benefits of loose coupling, reuse and extensibility.

(12 marks)

(ii) Explain the function of the service provider, the service consumer and the service directory.

(6 marks)

c) Briefly describe the key stages of the SOA lifecycle.

(4 marks)

END OF EXAM