

**B5.**

This question is about **OPERATIONAL NETWORK/NIS MANAGEMENT ISSUES**

- a) Define the sources of delay in a packet switched network and explain which of these are also relevant to circuit switched networks. **(8 marks)**
- b) With respect to its use in Asynchronous Transfer Mode (ATM) networks, describe the purpose and operation of the Leaky Bucket algorithm. **(9 marks)**
- c) What is meant by a virtual circuit? Consider and explain to what extent a virtual circuit between two end points, will meet the characteristics of a circuit switched network rather than a packet switched network. **(8 marks)**

**End of Examination**

**BCS THE CHARTERED INSTITUTE FOR IT**

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BCS Level 6 Professional Graduate Diploma in IT

**NETWORK INFORMATION SYSTEMS**

Tuesday 4<sup>th</sup> May 2021 - 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**

**For all questions illustrate your answers with diagrams where appropriate**

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.**

This question is about **ADVANTAGES AND DISADVANTAGES OF DISTRIBUTED PROCESSING SYSTEMS**

In the context of distributed processing systems, we usually use classifications with respect to **THREE** basic characteristics – Topology, Protocol, Architecture.

- a) With the help of diagrams, explain the **THREE** basic topologies used in computer networks - bus, ring, and star.  
**(12 marks)**
- b) Explain the **TWO** major types of network architecture: Peer-to-peer and client/server.  
**(8 marks)**
- c) There are several communication protocols designed over the years like Novell's IPX/SPX and Microsoft's NetBEUI, but de facto standard protocol nowadays for computer networks is the TCP/IP protocol. It is designed around the client-server model.

Can TCP/IP be used in every one of the architectures mentioned in part a) of the question? Explain your answer.

**(5 marks)**

**A2.**

This question is about **SECURITY, DATA INTEGRITY AND AVAILABILITY OF NIS**

- a) Define the term "Cyber Security" and explain its **THREE** main concerns: Confidentiality, Integrity, Availability.



**(12 marks)**

- b) Explain the term "encryption" and its **TWO** main approaches – encryption with symmetric key and encryption with asymmetric key.  
**(8 marks)**
- c) Explain the "digital signature" concept.  
**(5 marks)**

**Section B**  
**Answer Section B questions in Answer Book B**

**B3.**

This question is about **LOCAL AND WIDE AREA NETWORKS**

- a) Using a diagram if needed, describe in order the OSI 7-layer model and the function of each layer.  
**(14 marks)**
- b) In WiFi networks it is often possible to hear the terms "wireless access point" and "wireless router" being used interchangeably, both functions often existing in a single device. With reference to the OSI 7-layer model, describe the functionality of a wireless access point, and also of a wireless router.  
**(6 marks)**
- c) Consider why access points and routers have been combined into a single device, often with other services. Explain, with reference to at least **ONE** additional service that may be provided by a WiFi router both the benefits of such integration, as well as any disadvantages you might foresee.  
**(5 marks)**

**B4.**

This question is about **MESSAGING AND INFORMATION**

- a) Describe what is meant by a web service and the role of WSDL in such services. Explain in your answer how this differs from sites offering a website through the use of HTML pages only.  
**(8 marks)**
- b) What are the goals of a messaging protocol such as SOAP? How does such a protocol enable the provision of web services?  
**(6 marks)**
- c) Explain what the difference is between stateful and stateless web services.  
**(4 marks)**
- d) Consider a social media messaging platform such as Twitter. Explain whether this is a stateful or stateless service, and then discuss the advantages and drawbacks of implementing such a service with SOAP.  
**(7 marks)**