THIS PAPER IS NOT TO BE REMOVED FROM THE EXAMINATION HALLS

UNIVERSITY OF LONDON   **CO2222 ZB**

BSc Examination

COMPUTING AND INFORMATION SYSTEMS

Data Communications and Enterprise Networking

Date and Time: Thursday 4 May 2017: 14.30 – 17.30

Duration: 3 hours

This paper is in two parts: Part A and Part B. There are a total of **THREE** questions in each part. You should answer **TWO** questions from Part A and **TWO** questions from Part B.

Full marks will be awarded for complete answers to a total of **FOUR** questions, **TWO** from Part A and **TWO** from Part B. The marks for each part of a question are indicated at the end of the part in [.] brackets.

Only your first **TWO** answers from Part A and first **TWO** answers from Part B, in the order they appear in your answer book, will be marked.

There are 100 marks available on this paper.

No calculators should be used.

UL17/0480

Part A

Question 1

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

    i.   In switching, a channel will allocate all its capacity to one end-to-end communication.

    ii.   It is easy to add a node in a Star Network.

    iii. Abstract Syntax Notation (ASN.1) standard is only used for abstract syntax.

    iv. FTP is a stateless protocol.

[4]

b) There are three different types of switching. Provide their names and explain how they deal with end-to-end communication.

[10]

c) What problem does the Domain Name System (DNS) address?

[5]

d) How does TCP deal with flow control?

[6]

Question 2

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

    i.   The Network File System (NFS) uses Remote Procedure Calls (RPCs).

    ii.   Virtual circuit networks are connection-oriented networks.

    iii. IPSec cannot work in transport and tunnel modes.

    iv. Point-to-Point protocol is a bit-oriented protocol.

[4]

b) What is the difference between subnetting and supernetting? Provide examples to illustrate the difference.

[10]

c) How do Longitudinal Redundancy Checks work?

[6]

d) How would an ADSL modem work for a home broadband connection?

[5]

Question 3

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

    i.   Ethernet uses a p-persistent strategy.
    ii.   Radio transmission can be used with unguided media.
    iii. There may be multiple cost leaders competing within a market.
   iv. Public Switched Telephone Network (PSTN) is subject to noise.

[4]

b) What are the **FOUR** ways in which switch (or full duplex) Ethernets can operate? How does their performance compare?

[15]

c) Draw the network diagram below and use Dijkstra's algorithm to calculate the shortest route between A and L, where the numbers represent distances between the nodes. On your diagram, show the node labels you have used at each step of the algorithm and mark the shortest path with a thick line.

[6]
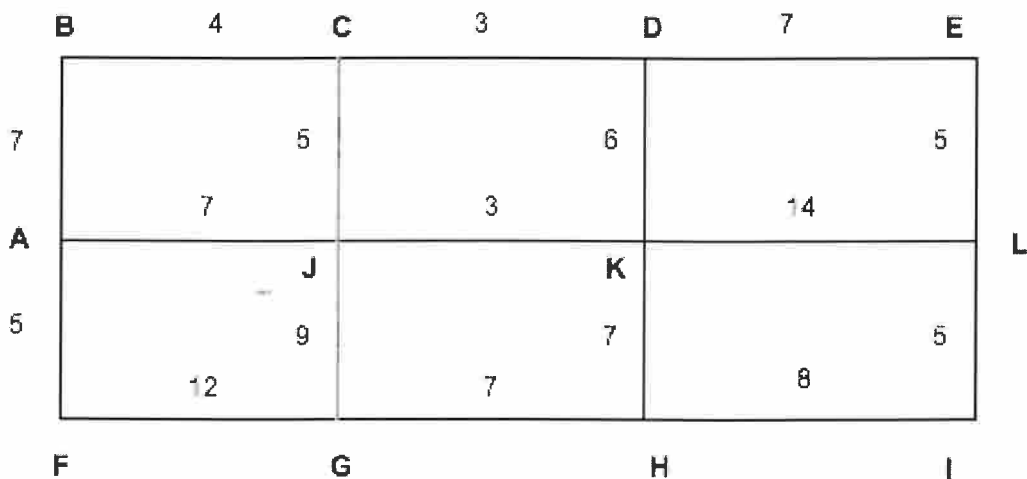
Part B

Question 4

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

    i.   Frame Relay protocol needs more overhead than the X.25 protocol.

    ii.   Spanning Tree Protocol (STP) is used for dealing with problems of transparent bridges having to forward frames to unknown MAC addresses.

    iii. IP VPNs are cheaper than building WANs.

    iv. The GIF image format is not lossless.

[4]

b) What happens in the Public Switched Telephone Network (PSTN) when there is high demand for a specific number or for making calls in general?

[5]

c) What are the **THREE** (two main and a hybrid) types of distributed routing? How do the two main ones compare?

[10]

d) Name and briefly explain the **FOUR** network design criteria.

[6]

Question 5

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

    i.   Multi-Protocol Label Switching (MPLS) provide Quality of Service while allowing IP to be connectionless.

    ii.   Building block design works well when designing private circuit networks.

    iii. CERT/CC is a resource for reporting network vulnerabilities.

    iv. Session Initiation Protocol (SIP) runs only on TCP.

[4]

b) You are a network engineer for a multinational company and it is decided that the current network infrastructure needs to be replaced. The current network is composed of a number of sub-networks that have some degree of autonomy as well as a couple of business-critical sub-networks that should remain operational at all costs. Describe the different approaches you might use for the migration and justify your final selection(s).

[10]

c) Briefly describe **ONE** of the two main mobile data protocols.

[5]

d) Name and briefly discuss **THREE** transmission impairments that demonstrate the need for error control at the physical layer, describing what are they are, and what causes them.

[6]

Question 6

a) State which **TWO** of the following statements are true and which **TWO** are false and, for false statements, write out a corrected true statement:

i. Tunnelling is about encapsulating source network Protocol Data Units (PDUs) inside the intervening network ones.
ii. Bridged LANs do not suffer from the broadcast storm problem.
iii. Digital data is transmitted digitally without any alternations.
iv. A thin client architecture is a good approach in reducing staff costs.

[4]

b) In a Virtual LAN (VLAN) what are the different ways in which a network manager can define workgroups?

[10]

c) Describe a Token Ring (what topology does it use and how does the protocol work).

[6]

d) How do X.500 and LDAP compare?

[5]

END OF PAPER