UNIVERSITY OF LONDON **CO2222 ZA**

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.

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. The usual multiplexing technique in broadband is Frequency-Division Multiplexing (FDM).
ii. Bus topology is used in Metropolitan Area Networks (MANs).
iii. Service Data Units (SDUs) are using the Protocol Data Units (PDUs) of the previous layer.
iv. Telnet uses the UDP protocol.

[4]

b) There are four different components that contribute to delay. Provide their names and briefly explain why they add to delay in signal transmission.

[10]

c) What is the functionality that the Network File System (NFS) provides? How is it implemented? Provide an example of where it might be used.

[11]

Note: missing details added in red

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. Active Directory (AD) uses LDAP.
ii. UDP has mechanisms for connection control.
iii. Transmission Control Protocol (TCP) can be described by a Finite State Machine (FSM).
iv. A large organisation can use a single class C network for its needs.

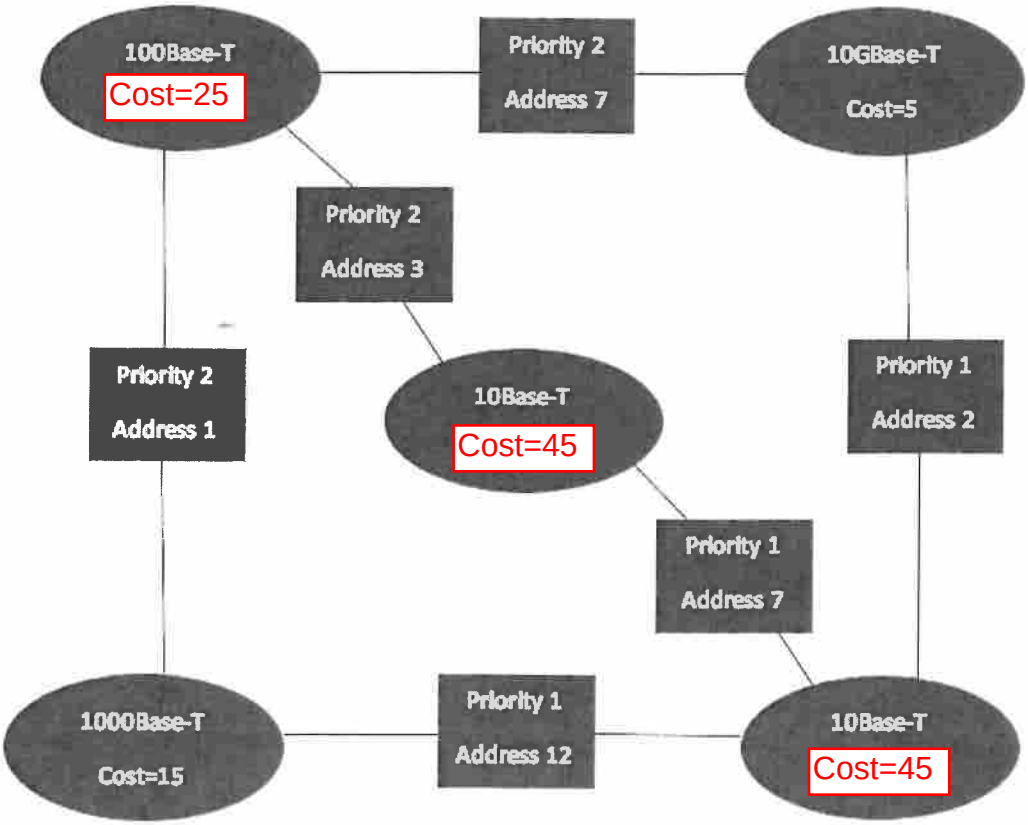
[4]

b) What are the three different ways in which the transport layer can be implemented? Briefly explain how Unix and Windows implement the transport layer.

[5]

c) Use the Spanning Tree Protocol to determine which bridge ports should be blocked in the following LAN topology. Draw this diagram in your answer book. Show which bridge is elected as the root bridge by means of a thick lined box and show the path costs from each bridge port to the root bridge. Mark all the root ports with an R and all the designated ports with a D and all the blocked ports with an X. Draw the spanning tree with thick lines on the diagram.

[6]



d) What is a virtual circuit network and how does it work? In which cases would you consider using one?

[10]

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. UDP has mechanisms for dealing with congestion.
ii. Transport Layer Security (TLS) uses Public Key Infrastructure (PKI).
iii. IPSec should be used with IPv6.
iv. The Media Access Control (MAC) address must be unique.

[4]

b) How does the User Datagram Protocol (UDP) work? How does it deal with error checking? Provide some examples where you might prefer to use UDP.

[10]

c) Briefly describe how the Internet Group Management Protocol (IGMP) works. Where would you consider using it?

[5]

d) What are the two modes in which IP Security Protocols (IP Sec) can operate?

[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. A dog is a product with low market share and low growth.
ii. In a Bluetooth network with three devices, communication can happen between all pairs of devices.
iii. WANs in the vast majority of cases are provided by licensed network operators.
iv. PSTN is a digital network with Frequency Division Multiplexing (FDM).

[4]

b) How do Longitudinal Redundancy Checks work?

[5]

c) Name and briefly describe **TWO** techniques for dealing with echo at the physical layer. What do they depend on and how well do they work?

[10]

d) What is a transparent bridge and how does it work? What are the advantages of using one?

[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. Intelligent networks can be used for the routing of 0800 numbers.
ii. Transparent bridges cannot be used on Ethernet networks.
iii. Source-route bridging works best with connectionless networks.
iv. Network Address Translation is usually used for translating public IP addresses to private ones.

[4]

b) What are the four functions that routers perform on datagrams that they receive?

[10]

c) How is a router different to a gateway?

[5]

d) Name **THREE** different approaches that can be used in network testing.

[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. The RTP protocol supports multicasting.
ii. ATM networks are connectionless.
iii. The big bang approach is the cheapest approach in network implementation.
iv. It does not matter what time units we use to measure uptime and total time when calculating availability – there would be no need for conversion of either, as we can just take the ratio.

[4]

b) What are the three main objections to Network Address Translation (NAT)?

[6]

c) What is defined as Total Cost of Ownership of a client computer and what measures can be taken to reduce it?

[8]

d) Describe the meaning of isolated routing.

[7]

END OF PAPER