THIS PAPER IS NOT TO BE REMOVED FROM THE EXAMINATION HALLS

UNIVERSITY OF LONDON **CO2222 ZA**

BSc Examination

COMPUTING AND INFORMATION SYSTEMS

Data Communications and Enterprise Networking

Friday 4 May 2018: 14.30 – 17.30

Time allowed: 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

Answer TWO questions from 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 a layered architecture it is not possible to change a layer.
ii. The HTTP protocol is based on a client-server model.
iii. Internet checksum is a method used for error control.
iv. Hamming codes are not part of the Forward Error Correction (FEC) technique.

[4]

b) How are nodes connected in a bus network topology? What are the advantages and disadvantages of using this topology? Your answer should include a diagram to illustrate how the devices are connected.

[6]

c) What is the effect of the congestion control mechanism on the throughput of TCP connections? How does it affect the suitability of TCP for transporting data of various kinds?

[6]

d) How does the polling access method work in the case of Controlled Access in Media Access Control? What are the advantages and disadvantages of such an approach?

[5]

e) A network is identified in a routing table as 192.118.62.0/19. What is the netmask, the broadcast address for the network and the first and last address of the network?

[4]

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. ADSL uses echo suppression techniques.
ii. ADSL works over local loops bypassing the PSTN.
iii. Cost leadership as a strategy is threatened by new technology.
iv. FireWire is not a peer-to-peer protocol.

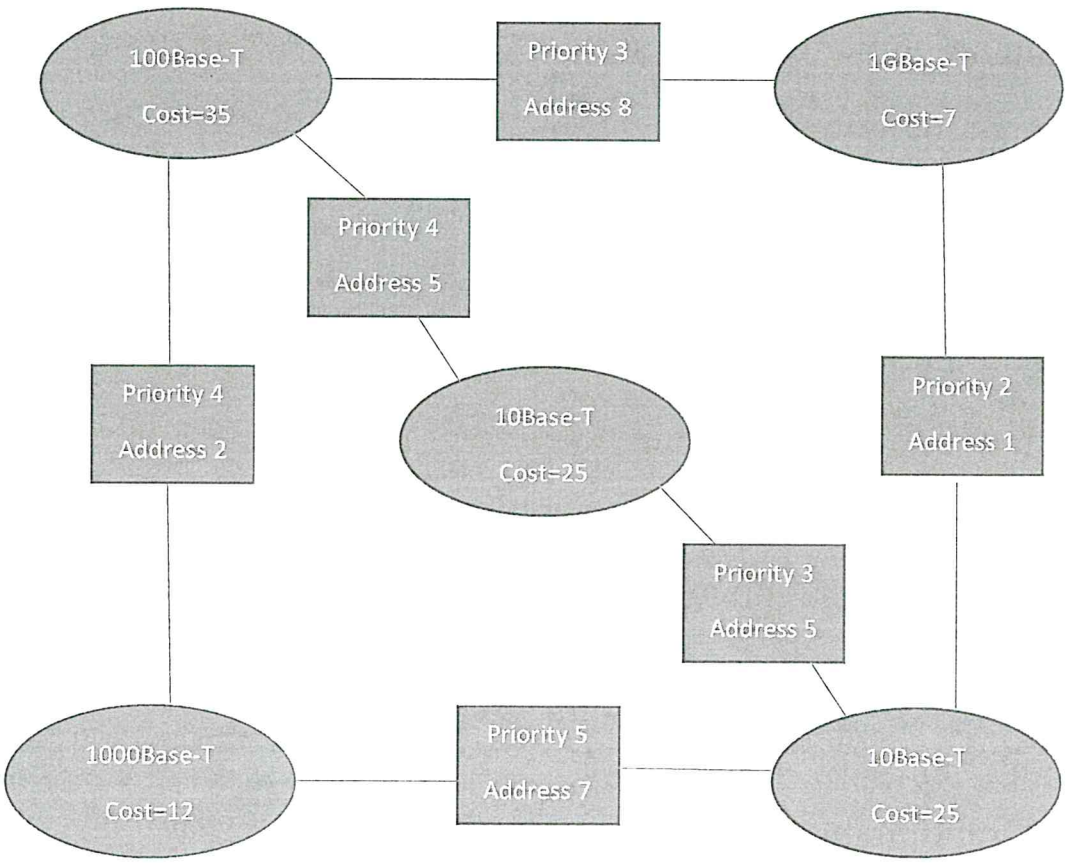
[4]

b) How does echo suppression work in order to deal with echoes in error control? Briefly describe a major application in which this is needed.

[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.

[7]



d) How does Automatic Repeat Request (ARQ) error correction work? How would we determine the number of frames that would be re-transmitted in the case of an error if the Go Back N correction mechanism is employed?

[5]

e) What is a point-to-multipoint configuration? How does transmission work in this configuration in Media Access Control (MAC) and in what cases would it be preferred?

[4]

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 CSMA/CD.

ii. IEEE Wireless LANS use CSMA/CD.

iii. Frame Relay protocol offers less sophisticated error-checking than X.25.

iv. Routers are the same as gateways.

[4]

b) How do satellite microwave communications work? What are their disadvantages?

[7]

c) How are attenuation and impulse noise defined and what are their effects?

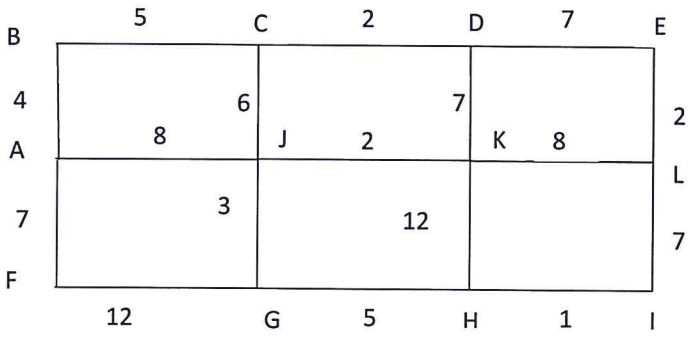
[4]

d) What does Shannon's law state, and where is it useful?

[4]

e) 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

Answer TWO questions from 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. IP VPNs provide a higher level of control regarding traffic than WANs.

ii. The RTSP protocol can support the streaming of both live and stored multimedia.

iii. Performance management metrics is a reactive approach.

iv. Mean Time To Repair (MTTR) is a measure of downtime.

[4]

b) How does Network Attached Storage (NAS) work? In which cases might it not be the preferred solution?

[6]

c) What is a VLAN? What benefits can an organisation get from deploying one?

[5]

d) What are the **THREE** types of station supported in Wireless LANs?

[6]

e) Why might an organisation consider using a private circuit network as opposed to the public network?

[4]

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. The ATM protocol has three layers.
ii. Building block design is a methodology for designing networks.
iii. Third-line support is provided mostly in-house.
iv. Asynchronous Transfer Mode (ATM) networks aim at providing all telecommunications services over multiple network infrastructures.

[4]

b) What steps are involved in placing a call on the Public Switched Telephone Network?

[7]

c) Provide **THREE** reasons why the use of a bridge in interconnecting networks would be beneficial.

[6]

d) What is the main problem related to the deployment of a transparent bridge? How is it caused?

[4]

e) Provide a brief explanation of how backward learning works with routers.

[4]

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 Real Time Streaming Protocol (RTSP) is not client-server based.

ii. Routing Information Protocol (RIP) supports Classless Inter-Domain Routing (CIDR).

iii. Token Ring suffers from cable breaks.

iv. VLAN configuration is done by software configuration on a LAN switch.

[4]

b) What does Network Address Translation (NAT) do? Why is there a need for it?

[6]

c) What creates the need for compression in the transmission of multimedia over the Internet?

[5]

d) State and define **TWO** ways of specifying reliability in network design.

[4]

e) State and specify **THREE** categories of requirements that need to be gathered during the network design phase.

[6]

END OF PAPER