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

Date and Time: Thursday 5 May 2016: 14.30 – 17.30

Duration: 3 hours

There are SIX questions on this paper. Candidates should answer **FOUR** questions (**TWO** from **PART A** and **TWO** from **PART B**). The mark 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 your first **TWO** answers from **PART B**, in the order that 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. Supernetting is a problem where you ask for a higher class address than the one you should, based on the number of hosts.

ii. IPv4 is a connection-oriented protocol.

iii. ARP conducts address resolution by means of broadcasting a packet to the entire network.

iv. IPv6 does not need the security extension of IPsec.

[4]

b) Define the terms bandwidth and throughput, providing the units in which each of them are measured.

[4]

c) Identify and describe different types of network based on the area they cover.

[6]

d) Why would an unreliable service such as UDP be the preferred choice for some application developers?

[6]

e) Explain how Huffman codes work. Draw the tree and explain how the word **VLAN** will be encoded for the alphabet {A, E, L, N, R, T, V} using the following values:

[5]

A	1001
E	101
L	110
N	11101
R	111
T	01
V	00

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. DNS requires the use of a distributed system.
   ii. Active Directory is using the X.500 protocol.
   iii. NFS is based on Remote Procedure Calls (RPCs).
   iv. IMAP does not allow for storage of messages on the server.

[4]

b) Describe the error detection mechanism used by TCP and UDP.

[9]

c) What is framing? How does the data link layer distinguish between the start and end of each frame?

[6]

d) Describe briefly how the Vertical Redundancy Checks (VRC) error detection mechanism works.

[6]

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. Echoplexing is an error-detection mechanism.
   ii. In broadcast type it is safe for two stations to transmit at the same time.
   iii. High-Level Data Link Control (HDLC) is a connectionless protocol.
   iv. Unipolar is a type of line code.

[4]

b) What are the two main error correction techniques used by modern data link protocols? Explain what they do and briefly mention the methods employed in them.

[8]

c) Describe two different authentication protocols for the Point-to-Point (PPP) protocol.

[4]

d) Briefly explain how character-oriented and bit-oriented framing works.

[4]

e) Define bit rate and baud rate assuming a baud with five-bit characters. What is the difference between them? How would 30Kbps and 6000Baud compare? What does Shannon's law state?

[5]

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. The differentiation strategy can discourage new companies entering the market.
   ii. Diversification is the most risky strategy for generating growth.
   iii. A dog is a profitable product.
   iv. Differentiation is not a popular strategy amongst mobile phone operators.

[4]

b) Define four different market segments for a consumer market.

[6]

c) Describe the problem of a broadcast storm and how Virtual LANs can be used as a preventive mechanism.

[6]

d) What are the issues associated with Plesiochronous Digital Hierarchy (PDH)?

[5]

e) Briefly describe intelligent networks for telephone networks – what services do they make possible?

[4]

Question 5

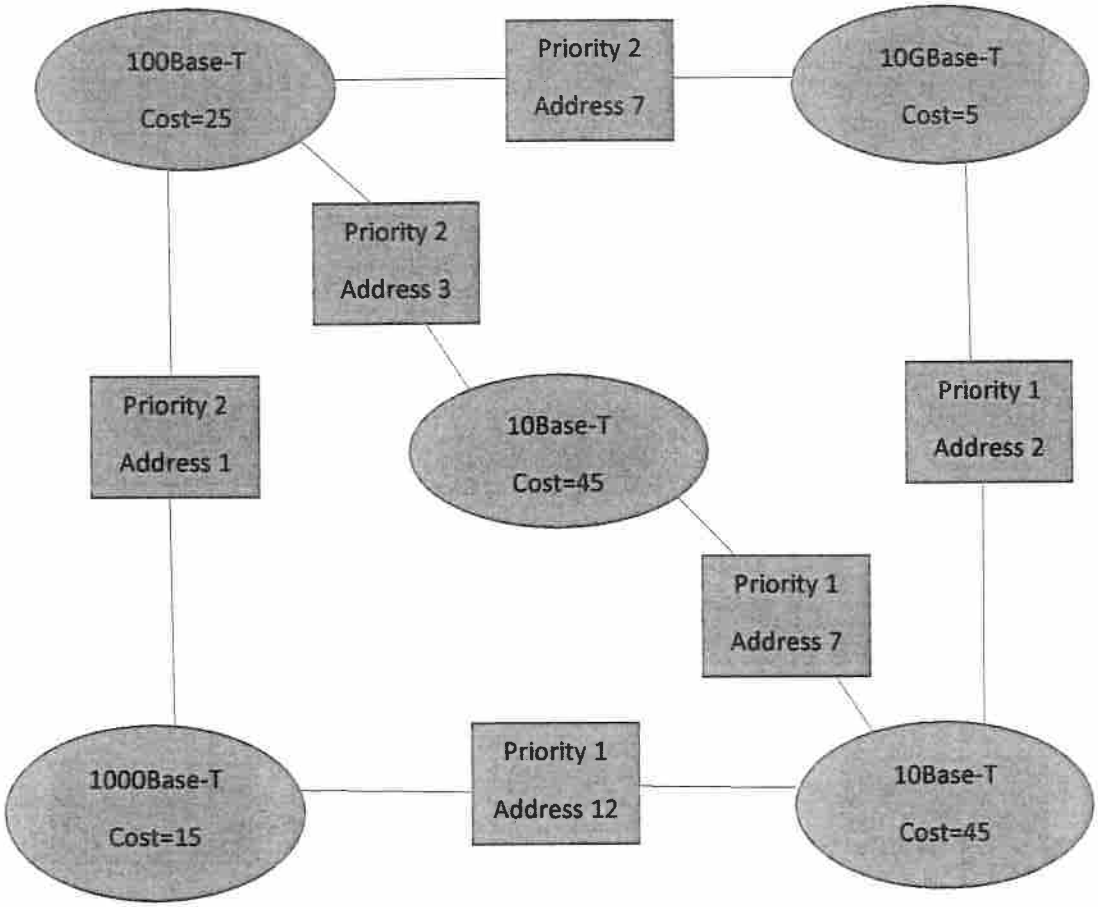
a) State which two of the following statements are true and which two are false and, for false statements, write out a corrected true statement:
   i. Frame Relay is a faster protocol than X.25.
   ii. Spanning Tree Protocol is used with source route bridges.
   iii. An Intranet can only run on a LAN.
   iv. Gateway is another term used for router.

[4]

b) What is internetworking and why is there is a need for it?

[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) Briefly describe four criteria used in Networking Design

[5]

e) Describe the flooding technique in isolated routing.

[5]

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. IP is a good protocol for multimedia applications.
   ii. Multi-Protocol Label Switching is a solution for ensuring Quality of Service for Internet applications.
   iii. The big bang approach is the preferred choice for network implementation.
   iv. A trap is an indicator that a parameter been monitored has an unexpected value.

[4]

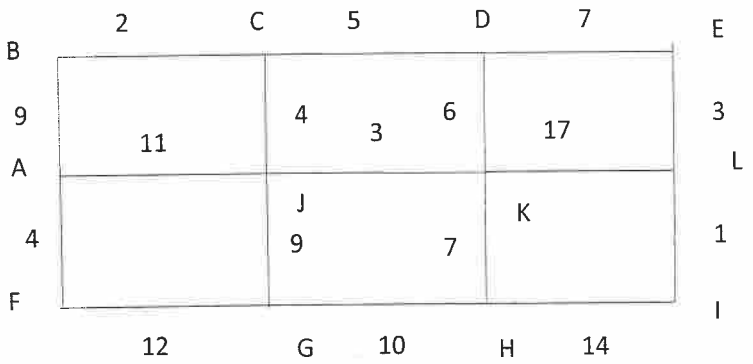
b) How can text be compressed in multimedia applications?

[5]

c) Briefly describe the Real Time Streaming Protocol (RSTP).

[5]

d) 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.



[5]

e) What are four main functions of fault management – briefly state what is the purpose of each phase?

[6]

END OF PAPER