北京郵電大學

Queen Mary University of London

EBU5403 A

Complete the information below about yourself very carefully.

QM student number										
BUPT student number										
Class number										

Joint Programme Examinations 2015/16

EBU5403 Internet Protocols

Paper A

Answer ALL questions

For examiners' use only

1	
2	
3	
4	
Total	

Make and type of any electronic calculator you are using

INSTRUCTIONS

1. **You must not take answer books, used or unused, from the examination room.**
2. Write only in black or blue pen **and in English**.
3. Do all rough work in the answer book – **do not tear out any pages**.
4. If you use Supplementary Answer Books, tie them to the end of this book.
5. Write clearly and legibly.
6. **Read the instructions on the inside cover.**

Examiners

Dr Yue Chen, Dr Michael Chai

Filename: 1516_EBU5403_A No answerbook required

Instructions

Before the start of the examination

1) Place your BUPT and QM student cards on the corner of your desk so that your picture is visible.

2) Put all bags, coats and other belongings at the back/front of the room. All small items in your pockets, including wallets, mobile phones and other electronic devices must be **placed in your bag in advance**. **Possession of mobile phones, electronic devices and unauthorised materials is an offence.**

3) Please ensure your mobile phone is switched off and that no alarm will sound during the exam. **A mobile phone causing a disruption is also an assessment offence.**

4) Do not turn over your question paper or begin writing until told to do.

During the examination

1) You must not communicate with or copy from another student.

2) If you require any assistance or wish to leave the examination room for any reason, please raise your hand to attract the attention of the invigilator.

3) If you finish the examination early you may leave, but not in the first 30 minutes or the last 10 minutes.

4) For 2 hour examinations you may **not** leave temporarily.

5) For examinations longer than 2 hours you **may** leave temporarily but not in the first 2 hours or the last 30 minutes.

At the end of the examination

1) You must stop writing immediately – **if you continue writing after being told to stop, that is an assessment offence.**

2) Remain in your seat until you are told you may leave.

Question 1 **[25 marks]**

a) Answer the following questions related to the Open Systems Interconnect (OSI) reference model.

i) Briefly explain why the OSI model is important for computer networking.

ii) List all layers of the OSI reference model.

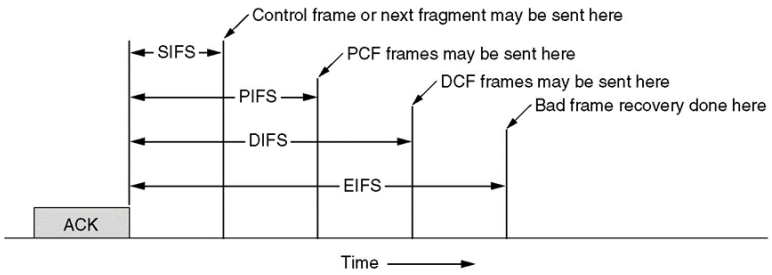
iii) Encapsulation involves converting data from Application layer to Physical layer of the OSI model. List the 5 different data format that are converted during the encapsulation process and briefly explain each of these data formats.

(12 marks)

b) Explain why a minimum frame size must be imposed in an IEEE 802.3 Carrier Sense Multiple Access/Collision Detection (CSMA/CD) network and calculate the size of this minimum frame, given a maximum one-way propagation delay of 1ms and a bit-rate of 1Mbps.

(6 marks)

c) With the aid of Figure 1, explain the operation of Distributed Coordination Function (DCF) in IEEE802.11 based networks.



SIFS – Short InterFrame Spacing
PIFS – PCF InterFrame Spacing
DIFS – DCF InterFrame Spacing
EIFS – Extended InterFrame Spacing

Figure 1:- Interframe spacing in IEEE802.11

(6 marks)

Answers for Question 1

	Do not write in this column
a)	

	14 marks

	Do not write in this column
b)	
	5 marks

	Do not write in this column
c)	
	6 marks

Question marking: $\frac{}{13} + \frac{}{6} + \frac{}{6} = \frac{}{25}$

Question 2 (Network Layer) **[25 marks]**

a) Find the class of the following Internet Protocol version 4 (IPv4) addresses:

i) 208.40.60.88

ii) 238.1.1.8

iii) 242.8.6.200

iv) 16.70.6.80

(4 marks)

b) An organisation is granted a classful IP address of 200.60.80.0. The administrator wants to create 4 subnets. Assume that very little future growth of the organisation will take place and that variable-length subnet masking (VLSM) is NOT supported.

i) Calculate the network addresses and subnetwork mask of the four subnets in dotted decimal notation.

ii) Find the number of addresses in each subnet.

iii) Find the local broadcast addresses in Subnet 2 and Subnet 3.

(8 marks)

c) Answer the following questions related to routing.

i) Briefly explain what is meant by dynamic routing

ii) With reference to Figure 2, use Dijkstra's algorithm to produce the Shortest Path Tree at Node A, assuming all link costs are 1.

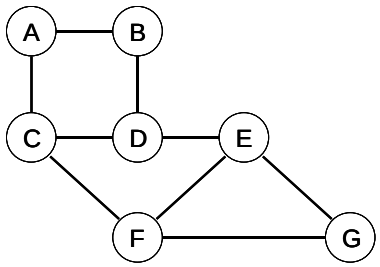


Figure 2:- Network Topology

(13 marks)

Answers for Question 2

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a)	
	4 marks

	Do not write in this column
b)	

8 marks

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c)	

	13 marks

Question marking: $\frac{}{4} + \frac{}{8} + \frac{}{13} = \frac{}{25}$

Question 3 (Transport Layer) **[25 marks]**

a) Briefly explain the following terminologies related to Transport Layer:

i) Connection-Oriented Services

ii) Connectionless Services

iii) Flow-control

iv) Congestion Control

(12 marks)

b) With the aid of a diagram, describe the operation of Selective-Repeat transport layer protocol.

(7 marks)

c) Answer the following questions related to User Datagram Protocol (UDP)

i) List and briefly describe each header field in UDP.

ii) Explain why where the reliability is not of primary importance, UDP would make a good transport protocol.

(6 marks)

Answers for Question 3

	Do not write in this column
a)	

		12 marks

Do not write in this column

b)

7 marks

	Do not write in this column
c)	
	6 marks

Question marking: $\frac{}{12} + \frac{}{7} + \frac{}{6} = \frac{}{25}$

Question 4 (Transmission Control Protocol & Multi-Protocol Label Switching) [25 marks]

a) Answer the following questions with regard to Transmission Control Protocol (TCP):

i) Identify the disadvantages of cumulative acknowledgement at TCP.

ii) Explain the reason(s) why a sender receives duplicate acknowledgements.

iii) Explain how the information is used in TCP Reno to maintain channel utilisation.

(9 marks)

b) Explain the cause of Silly Window Syndrome and suggest how it can be avoided.

(6 marks)

c) In the context of Multi-Protocol Label Switching (MPLS), explain the following terminologies:

i) Forwarding Equivalence Class (FEC)

ii) Label Switched Path (LSP)

iii) Pushing

iv) Swapping

v) Popping

(10 marks)

Answers for Question 4

	Do not write in this column
a)	

12 marks

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b)	
	6 marks

	Do not write in this column
c)	
	7 marks

Question marking: $\overline{}{12} + \overline{}{6} + \overline{}{7} = \overline{}{25}$

Use this section for rough work

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