



北京邮电大学

For examiners' use only

EBU5403 A

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4	
Total	

Joint Programme Examinations 2016/17

EBU5403 Internet Protocols

Paper A

Time allowed 2 hours

Answer ALL questions

Complete the information below about yourself very carefully.

QM student number

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BUPT student number

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Class number

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INSTRUCTIONS

1. You must NOT take answer books, used or unused, from the examination room.
2. Write only with a 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

Prof Yue Chen, Dr Richard Clegg, Dr Michael Chai

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

- a. Give the name (not number) of the two layers which are in the OSI network stack but not the TCP/IP network stack?

[2 marks]

	Do not write in this column
	2 marks

- b. Give the name (not number) of the layer of the TCP/IP stack which:

[3 marks]

- i. Transmits bits over a medium using the electronic, optical or mechanical properties of that medium. **(1 mark)**
- ii. Is responsible for moving packets from their original source on the network to their final destination. **(1 mark)**
- iii. Ensures that (if required) transmitted data arrives in order at the final destination, without loss or corruption. **(1 mark)**

(1 mark)

	Do not write in this column
	3 marks

- c. In Carrier Sense Multiple Access/Collision Avoidance, give the full name and briefly explain the role of ACK, RTS and CTS

[9 marks]

[illegible]

- d. Put ACK, RTS, CTS and Data transmission into the correct order that they would be sent in a successful CSMA/CA transmission

[1 mark]

	Do not write in this column
	1 mark

- e. Briefly define full-duplex, simplex and half-duplex transmission.

[4 marks]

	Do not write in this column
	4 marks

[illegible]

Question marking: $\frac{-}{2} + \frac{-}{3} + \frac{-}{9} + \frac{-}{1} + \frac{-}{4} + \frac{-}{6} = \frac{-}{25}$

Question 2

- a) Answer the following questions with regard to Internet Protocol version 4 (IPv4) addressing and Internet Protocol version 6 (IPv6) addressing.

[8 marks]

- i) Identify the class of IPv4 address 227.34.78.1 and calculate all the subnetwork addresses of 227.34.78.0/26

(5 marks)

- ii) Below is the IPv4 mapped IPv6 address.

0.0.0.0.0.0.0.0.0.0.255.255.14.0.20.80

- Identify when the IPv4 mapped IPv6 address is used.
- Convert it to Colon Hexadecimal Notation.

(3 marks)

[illegible]

[illegible]

b) Answer the following questions related to routing.

[8 marks]

i) As referring to Figure 1, describe the undesirable behaviour that can arise between nodes A and B because of a link failure such as between nodes B and C. And explain how the split-horizon technique can be of benefit.

(4 marks)

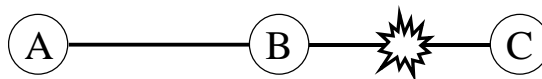


Figure 1:- Split Horizon Illustration

ii) Briefly explain how the two following enhancements to Routing Information Protocol (RIP) that can be used to facilitate rapid re-convergence.

- Hold down timer
- Triggered updates

(4 marks)

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[illegible]

[illegible]

b) Provide brief definition of the following terminologies related to Transport layer.

[7 marks]

i) Flow control

(3 marks)

ii) Congestion control

(2 marks)

- iii) Error control

(2 marks)

[illegible]

[illegible]

- c) Explain how flow control can be used to prevent receive buffer overflow using a Sliding Window approach.

[6 marks]

[illegible]

[illegible]

Question marking: $\frac{1}{12} + \frac{1}{7} + \frac{1}{6} = \frac{1}{25}$

Question 4

a) Explain the purpose of the following TCP segment header fields:

[8 marks]

i) **Source / Destination Port Numbers**

(2 marks)

ii) SYN Flag

(2 marks)

iii) Data Offset

(2 marks)

iv) Acknowledgement Number

(2 marks)

[illegible]

[illegible]

- b) With the aid of diagrams, explain how TCP maintains the transmission as a connection-oriented transport layer protocol.

[6 marks]

[illegible]

[illegible]

c) Answer the following questions with regard to Transmission Control Protocol (TCP).

[11 marks]

i) What can be deduced from the reception of duplicate acknowledgements? How is this information used in TCP Reno to maintain channel utilisation?

(5 marks)

ii) Describe the mechanism of TCP's Path MTU Discovery.

(3 marks)

iii) Why is the TCP transport service traditionally unsuitable for real-time data? Use a real-time voice flow as an example within your answer.

(3 marks)

[illegible]

[illegible]

[illegible]

Question marking: $\frac{8}{8} + \frac{6}{6} + \frac{11}{11} = \frac{25}{25}$

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