北京郵電大學

Queen Mary
University of London

EBU721U

Complete the information below about yourself very carefully.

QM student number	
BUPT student number	
Class number	

Joint Programme Examinations 2013/14

EBU721U Ad hoc and Broadband Wireless

Paper A

Answer ALL questions

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 Yan SUN, Dr Michael Chai

Filename: 1314_EBU721U_A No answerbook required

Question 1

a) What is the "hidden terminal" problem?

[5 marks]

b) Describe how host computer 192.168.1.2 is able to deliver Internet Protocol datagrams to host 192.168.1.4 on the same Ethernet network, via bridge BR, illustrating your answer with reference to Figure 1a. Your answer should include a full description of the role played by the Address Resolution Protocol (ARP) and assume that no previous communication has taken place for some time.

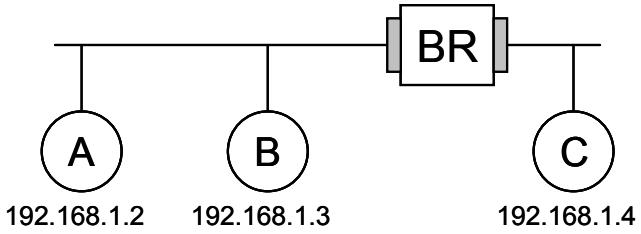

Figure 1a:- Network Topology 1

[8 marks]

c) The bridge is now replaced with a router RT, as shown in Figure 1b. Explain any differences that would arise in the process of how host 192.168.1.2 delivers data to host 192.168.2.4. Once again, assume that no previous communication has taken place for some time.

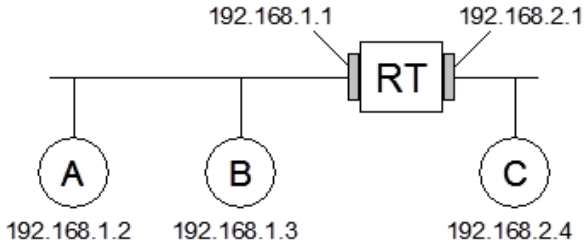

Figure 1b:- Network Topology 2

[8 marks]

d) Give four reasons why wired-network IP routing is unsuitable for MANETs

[4 marks]

Question 2

a) With reference to Figure 2 use Dijkstra's algorithm to produce the Shortest Path Tree at Router G, cost of links is indicated above the links in the figure. Breaking down steps need to be addressed in a table and the completion of shortest path tree need to be demonstrated in a diagram.

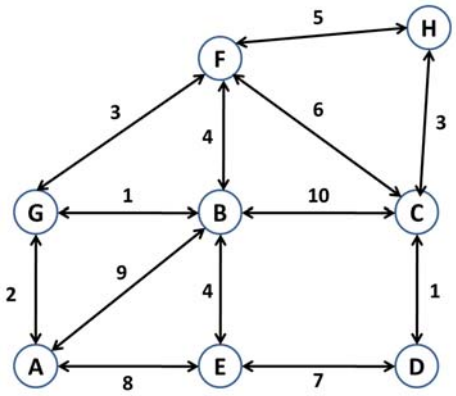

Figure 2: Network Topology

[10 marks]

b) Explain the ABR route maintenance when

i) DEST moves;

ii) IN moves.

[12 marks]

c) Name three proposed multicast routing protocols in mobile ad-hoc networks.

[3 marks]

Question 3

a) Considering the traditional TCP in wired IP network,

i) What are the advantages and disadvantages of the fact that TCP acknowledgements are cumulative?

[9 marks]

ii) What can be deduced from the reception of duplicate acknowledgements?

[2 marks]

iii) How is this information used in TCP Reno to maintain channel utilisation?

[3 marks]

b) Explain in details two reasons why current TCP does not perform well in ad hoc wireless networks.

[6 marks]

c) Considering the TCP in Mobile Ad Hoc Networks,

i) Explain which state is introduced in TCP-F and how it works.

[4 marks]

ii) What are the problems of TCP-F?

[3 marks]

Question 4

a) Several applications for MANETs have been proposed but, currently, none have been realised commercially. Describe three possible applications. In each case, comment on one potential advantage and one reason why the application has not been a commercial success.

[9 marks]

b) TCP congestion control uses 4 basic mechanisms known as Additive Increase (AI), Multiplicative Decrease (MD), Slow Start and Fast Recovery.

i) Briefly explain each of those 4 basic mechanisms.

ii) Describe the commons and differences in the design of TCP Tahoe and TCP Reno. Show how those 4 basic mechanisms were applied in the designs.

[12 marks]

c) Describe how stable routes are identified in Associativity-Based Routing, (ABR).

[4 marks]