UNIVERSITY OF GLAMORGAN
Prifysgol Morgannwg

Examinations: **MAIN SESSION 2006/2007**		
Validated Module Code: SY4S10	**Validated Module Title:** Wireless Networks	
Date	**Time**	**Duration:** 3 hours

Open/Closed Book	Closed	**And**	**Rubric checked**	yes
Duration checked	yes	**And**	**Questions checked**	yes
Attachments checked	yes	**And**	**Amendments checked**	yes

I confirm that the attached paper is accurate, complete and appropriate for use in the examination room, includes all necessary attachments relevant to the examination and that all attached papres and documents are of a quality ready for photocopying.

Module Leader:	Print Name: G Mulley and K Al-Begain	Signature:
Admin Check:	Print Name:	Signature:
Contact Number:	x3622	

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The following items are provided:

Examination book (inc 2 sheets graph paper)

Instructions to Candidates:

This examination paper is a closed book examination.

N.B. This paper consists of 8 questions

You should answer any 5 questions

All questions carry equal marks

Question 1

‘‘Python is a useful scripting language in which to build wireless client server prototypes’’, discuss.

(20 marks)

Question 2

What are the features of secure shell (`ssh`) which make it attractive to use across a wireless network? Illustrate your answer using appropriate examples.

(20 marks)

Question 3

Provide pseudo code and/or Python code for an application which tests the performance of a wireless network link. Draw an appropriate test wireless network diagram. Your application might consist of a client and server component. Ensure that you state exactly where each component resides and explain what your application code is actually measuring.

(20 marks)

Question 4

```
#!/usr/bin/python

import os
import sys
from socket import *

localPortNo=8001
maxTries=10
blockSize=65536*16

def createTCPSocketSSH (remoteHostname, remotePort=22, localPort=-1):
    global localPortNo
    if localPort == -1:
        localPort = localPortNo
        localPortNo = localPortNo+1
    tryNo = 1
    while 1:
        command = 'ssh  some command line arguments which tunnel
                    packets from localPort to remoteHostname:remotePort\n'
        result = os.system(command)
        if result == 0:
            break
        localPortNo = localPortNo+1
        tryNo = tryNo + 1
        if tryNo == maxTries:
            os.exit(1)

    s = socket(AF_INET, SOCK_STREAM)
    s.connect(('localhost', localPort))
    return s

def streamMP3 (fileName):
    global s
    s.send(fileName)
    data = s.recv(blockSize)
    while data:
        print data
        data = s.recv(blockSize)

s = createTCPSocketSSH('mcgreg.comp.glam.ac.uk', 8080)
streamMP3('04.mp3')
```

(a) Give a line by line commentary for the above code. You may ignore all the detail for the options in the `ssh` command providing that you provide a high level broad description of this command.

(15 marks)

(b) Provide a network diagram with supporting narrative which shows the pertinent connection details relating to the above code.

(5 marks)

Question 5

(a) Wireless and Mobile are interchangeably used terms nowadays. Discuss the common and different aspect of these.

(4 marks)

(b) Give critical comparison between issues arising in Mobile Networks versus Fixed Networks.

(8 marks)

(c) Explain the overlay and hotspot concept in wireless networks.

(8 marks)

Question 6

(a) Define the different propagation ranges in Wireless networks.

(6 marks)

(b) Discuss critically the different factors influencing radio signal propagation.

(8 marks)

(c) Explain the multipath propagation principle with pros and cons.

(6 marks)

Question 7

(a) Medium Access in wireless network faces some interesting problems including Hidden and exposed terminals. What are these and what is their reason?

(6 marks)

(b) How can the RTS/CTS method solve the problems in (a).

(6 marks)

(c) Explain in details the main components of the CSMA/CA method.

(8 marks)

Question 8

(a) Describe in details the architecture of a GSM Network with critical evaluation of the role of each main component.

(12 marks)

(b) Where does GPRS bring change to the GSM system?

(8 marks)
