UNIVERSITY *of* LIMERICK

O L L S C O I L   L U I M N I G H

COLLEGE *of* INFORMATICS *and* ELECTRONICS

Department of Computer Science
and Information Systems

End-of-Semester Assessment Paper

Academic Year:	2005/2006	Semester:	Spring
Module Title:	Telecommunication Networks Architectures	Module Code:	CS4228
Duration of Exam:	2½ Hours	Percent of Total Marks:	85
Lecturer(s):	Dr Séamus O'Shea	Paper marked out of :	100

Instructions to Candidates:

Answer any 3 questions.

Q1.
(a) Briefly compare the demands made on the underlying signalling system in both fixed and mobile networks.   (10 marks)
(b) Set out the main characteristics of the SS7 signalling network. Give examples of how reliability of the SS7 signalling network is achieved.   (10 marks)
(c) Consider the signalling link layer of SS7. Is the protocol at this level of the stop-and-wait or of the pipelined type? What kind of events would cause the receiver of an SS7 message, at the signalling link layer, to request a retransmission? How is the request for retransmission indicated to the sender? How does the receiver distinguish a retransmitted message from the original?
                                                                                                        (13 marks)

Q2.
(a) What additional services, in addition to those of MTP, does SCCP provide in the SS7 system? Give examples of users of those additional services.   (10 marks)

(b) How does Global Title (GT) addressing differ from Point Code addressing in SS7? Describe the kind of information that is encoded in each address type, and give examples of where each type may be typically used.   (10 marks)
(c) Discuss the role of both SCCP and TCAP in the interaction between an MSC/VLR and a user's HLR in the process of retrieving the user's profile for authentication purposes. In the case where the HLR and the MSC/VLR are in different countries, (i.e international roaming) describe how Global Title addressing is used to generate routing labels at intermediate nodes between the MSC/VLR and the HLR.   (13 marks)

Q3.

(a) Explain how the location of a mobile GSM user is determined in order to connect a telephone call. How does an idle MS discover an incoming call? (8 marks)

(b) What is the role of the MS in providing location information to the GSM network? Suppose you travel abroad. How does the serving foreign GSM network discover where your home HLR is? Why does it need to contact the HLR? (8 marks)

(c) Suppose your friend calls your mobile number, assuming you are at home. Outline the sequence of steps involved in connecting his call to you while you are abroad. (8 marks)

(d) Draw a diagram to show the configuration of the SS7 protocol stack in each of the nodes that are involved in establishing the call to you at your foreign location. (10 marks)

Q4.

(a) In relation to GSM data services, outline the driving forces which resulted in the introduction of GPRS. (10 marks)

(b) Briefly describe what the purpose of the Session Management protocol in GPRS is. What is accomplished as a result of the GPRS 'attach' procedure? Why is it necessary for a PDP context to be established on behalf of every user before any data can be sent or received. Set out the attributes of a PDP context. (11 marks)

(c) Contrast the Mobility Management (MM) requirements in GSM and GPRS and explain any differences. (12 marks)

Q5.

(a) Compare the approaches of 'Intserv' and 'Diffserv' regarding the provision of QoS in the developing Internet. (11 marks)

(b) Describe the contribution of RTP in alleviating the effects of 'best effort' transport of streamed audio and video. (11 marks)

(c) Give an example of a situation where content to be streamed may originate at several sources, and may have to be delivered to several receivers. Describe the role of RSVP in this type of situation. (11 marks)