## PRINCE OF SONGKLA UNIVERSITY
## FACULTY OF ENGINEERING

**Midterm Examination:** Semester 2          **Academic Year:** 2003-2004

**Date:** December 26, 2003          **Time:** 09:00 – 12:00

**Subject Number:** 240-575          **Room:** R300

**Subject Title:** Special Topics in Information Network Engineering II
(Multicast Protocols and Applications)

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**Exam Duration:** 3 hours

**This paper has 3 pages** (including this page).

**Authorised Materials:**

- Anything the student can carry.

**Instructions to Students:**

- *Answer questions in English.* Good English is **not** required.

- Attempt all questions

- Write answers in an answer book

- Start the answer to each question on a new page.

- **Clearly Number** the answers.  It is **not** required that questions be answered in order.

- Anything illegible is incorrect.

- Answer briefly where possible, essays are **not** required.

- The marks allocated for each question are shown next to that question.  There are 100 marks total for this examination.  This will contribute 20% of the course total.

**Question 1.**                                             *(15 marks)*

Explain, with examples, why multicast is a desirable technology to have existing in the Internet.

Also indicate some of the major difficulties caused by implementing multicast, that might explain why it is not currently more widely used.

**Question 2.**                                             *(20 marks)*

In IGMP versions 1 & 2, and MLD v1, most nodes suppress REPORT messages after receiving a QUERY.

Explain the method by which this is accomplished.

Explain why it was considered both acceptable, and a good design choice, to specify and implement this mechanism.

Why do IGMP v3, and MLD v2, not continue with this procedure?

**Question 3.**                                             *(10 marks)*

Explain the reasons why a DVMRP router periodically forgets (discards) all state relating to PRUNE messages it has received.

What short and long term effects does this have upon the network?

**Question 4.**                                             *(15 marks)*

Explain the need for some method for limiting the scope of multicast groups. Indicate problems that could occur if there were no limitations on any group distribution.

Give an example of a method that can be used to implement controls over group membership. That is, a method to limit what systems are able to receive packets being transmitted to a multicast group from a particular sender (assuming the sender desires to limit the distribution).

**Question 5.**                                                         *(10 marks)*

Explain the purpose of Reverse Path Forwarding as used in multicast packet distribution.

**Question 6.**                                                         *(5 marks)*

Why is one router on a LAN selected as a Multicast Querier Router?

How is it determined which router will be the Querier Router?

**Question 7.**                                                         *(10 marks)*

A host connected to an ethernet, to which 7 other hosts are also connected, as well as 3 multicast capable routers, desires to send a packet to a global scope multicast group.

How does the host determine where it should transmit its packet? (Or, to write this another way, what destination address will the packet contain in its ethernet headers when it is transmitted?)

You can assume that the network in question is connected to a worldwide multicast system, to which all relevant recipients are also connected.

**Question 8.**                                                         *(5 marks)*

What differences are there between IPv4 multicast and IPv6 multicast?

**Question 9.**                                                         *(10 marks)*

Multicast using MOSPF as its routing protocol is routed quite differently than multicast using DVMRP.

Explain the most significant differences.

What are the advantages and disadvantages of each of those two multicast routing protocols?