

Question 1.

(20 marks)

- A) 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.

[5 marks]

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

[5 marks]

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

[5 marks]

- D) What method is used in IGMPv3 (or MLD v2) and what savings can be achieved for network traffic because of this.

[5 marks]

Question 2.

(15 marks)

Explain the difficulties associated with assigning multicast group identifiers (multicast addresses) for IPv4, including mention of the problems that can occur if allocation is not performed carefully.

Then show how group ID allocation can be done for IPv6 multicast so as to avoid the difficulties with IPv4 multicast group ID (address) assignments.

Explain the method used to solve the problem, and show, using an example, how that method is used.

Question 3.

(15 marks)

What is the function of the Reverse Path Forwarding (RPF) algorithm in a multicast router?

Show using an example how the algorithm works when multicast packets are forwarded, and when they are not forwarded.

Question 4.

(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 5.

(10 marks)

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

A) Explain the most significant differences.

[4 marks]

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

[6 marks]

Question 6.

(15 marks)

PIM (Protocol Independent Multicast) has two variants - **Dense** mode PIM, and **Sparse** mode PIM.

- A) Explain the major differences between those two variants of PIM, indicating in what kinds of networks each might be preferred. [7 marks]

- B) Explain the differences between PIM and DVMRP, indicating why PIM is replacing DVMRP as the most common intra-network multicast routing protocol. [8 marks]

Question 7.

(5 marks)

Explain why it is never correct for a router forwarding a multicast packet to transmit the packet back through the same interface from which it was received (in contrast to a router forwarding a unicast packet which sometimes needs to do that.)
