ORDRE DES INGÉNIEURS DU QUÉBEC

NOVEMBER 2019 SESSION

Open-book examination
Non-programmable calculators : only authorized models
Duration : 3 hours

14-IF-A7 Computer Communications

1. Explain the difference between intermodulation noise and crosstalk. In each case what is the physical phenomenon at the source of noise or interference? How is-it the cause and in what situations? How are the noisy signals resulting? (10 points)

2. We consider a radio channel that the spectrum is between 915 and 918 MHz with a signal to noise ratio of 15 dB. What is the maximum theoretical capacity of this channel? If you can achieve this limit how many signaling levels are required? (20 points)

3. Explain what the Spanning Tree Approach is and how it can be used in the case of bridges between LAN. In particular explain the difference between a bridge and a router **(10 points)** and explain the three mechanisms involved in spanning tree algorithms: frame forwarding, address learning and loop resolution (30 points).

4. Why is a flow control mechanism needed in transport protocols? (10 points)

5. What is the advantage of the ring network architecture (Token Ring) that can still be used in some cases despite its complexity? What is the origin of this complexity? (20 points)