PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Mid-Term Examination: Semester I   Academic Year: 2005

Date: 7 สิงหาคม 2548   Time:09.00 – 12.00

Subject: 240-460 Broadband Integrated Networks   Room: R 200

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา

Instructions

- In this paper exam, there are FIVE questions. Answer ALL questions.

- The answer can be either in Thai or English,

- Calculators, Books, and notes are not allowed.

1. There are 4 nodes in the communication system as shown in Figure 1 (A). Node A and B transmit data by using router R to deliver traffic to their destination nodes C and D respectively. Only a single buffer is provided in R (traffic from A and B are stored into the same buffer). The service discipline of R is first-come-first-serve. The link bandwidth, which is a normalised value and indicated by C, are 8, 2, 2, 3 for the link A-R, B-R, R-C, and R-D, respectively. Node B is a fixed transmission rate source while A is a variable rate source. Node A is able to vary its transmission rate, f, up to 8. Node B transmits data first until time zero then node A inserts its traffic. From the given graph in Figure 1 (B), answer the following questions (please explain clearly):

    1.1 Explain what, why, and how (a),(b),(c) and (d) happen, (10 points)

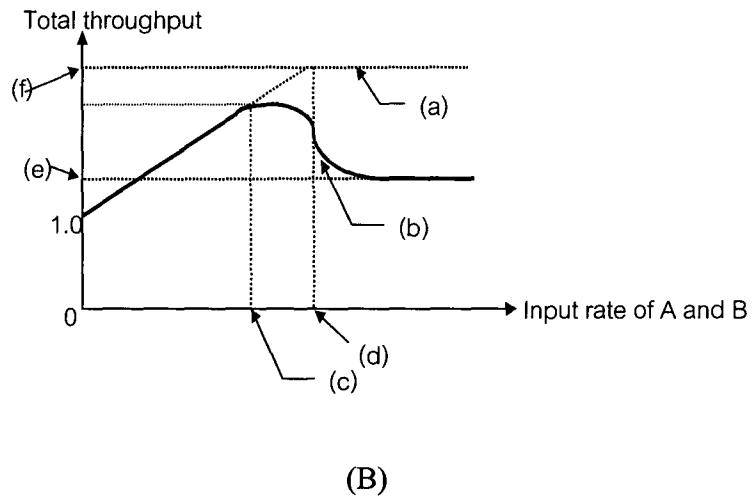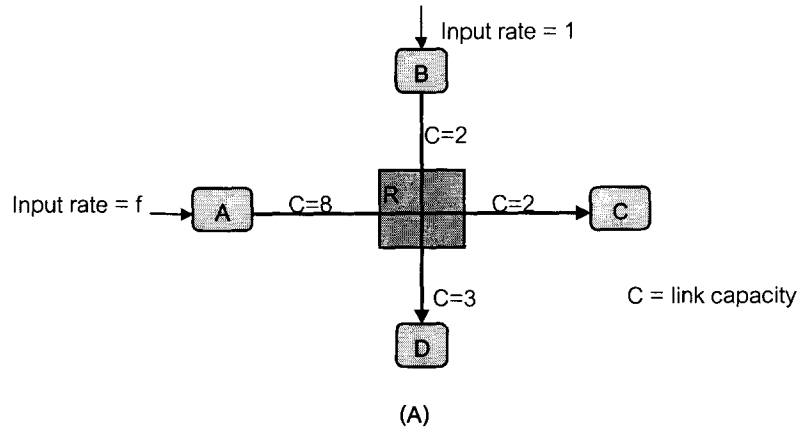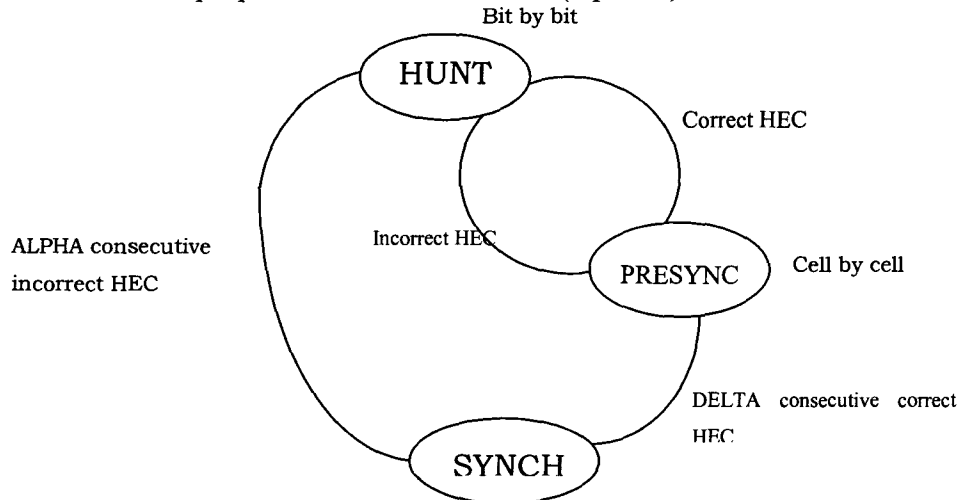   1.2 Give the normalised values in (e) and (f). Please show how you get such figures, (10 points)

(A)

(B)

Figure 1 Figure (A) and (B) used for question 1

2. Answer the following questions

2.1 What is the purpose of this mechanism? (5 points)

Figure 2 Figure used for question 2.1

2.2 In ATM networks, any VCI from a source to a destination may change when it passes any ATM switch in the network. Explain why and how this scenario happens. You should give an example to amplify your answer (5 points).

2.3 Why does ATM not require acknowledgement mechanism? (5 points)

2.4 The Figure 3 below shows the main working steps of CLIP (Classical IP over ATM) (5 points)

Figure 3 Working steps of classical IP over ATM

Please describe each step in Figure 3, how it works.

3. Answer the following questions

3.1 How many VC and VP can be carried on ATM network at UNI and NNI per a switch port? (5 points), e.g. What is the maximum of connections can be happen in ATM switch (per port)?

Figure 4 Figure used for question 3.1

3.2 Why do we need VP switching and VC switching in ATM switch? What are their advantages? (5 points)

3.3 What is QoS (Quality of Service)? What are measuring parameters associating with QoS (e.g. End-to-end delay)? (5 points)

3.4 Explain desirable properties of a good flow control scheme (5 points)

4. Answer the following questions:

4.1 What are the differences between open loop and closed loop flow control? (5 points)

4.2 What are the differences between preventive flow control and reactive flow control? (5 points)

4.3 What are the differences between ABR (Available Bit Rate) and VBR (Variable Bit Rate) services (in a table form)? (5 points)

4.4 Why can ATM be used in LAN, MAN, and WAN? (5 points)

5 AMT Flow Control

5.1 Explain how EFCI (Explicit Forward Congestion Indication) works, please also show source node behavior in terms of traffic load.(10 points)
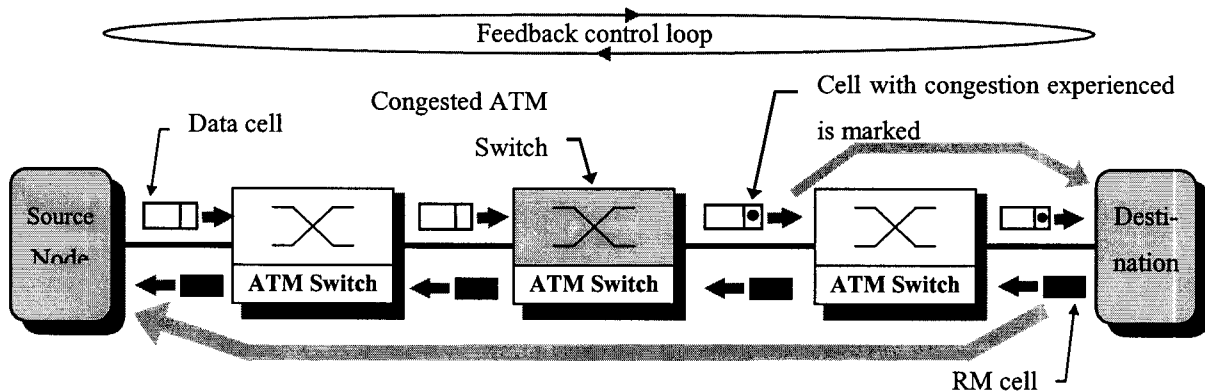
Figure 5 Figure used for question 5.1

5.2 Figure 6 below is 3-stage delta-network switch. Please give the value of 'xxx' and 'yyy' if the output ports are 2, and 7 respectively (the most significant bit is for the stage 1). (5 points)
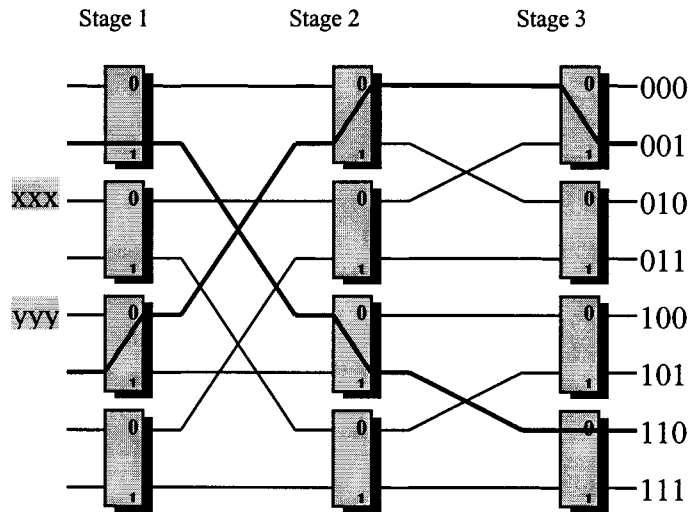
Figure 6 Figure used for question 5.1

5.3 (5 points)
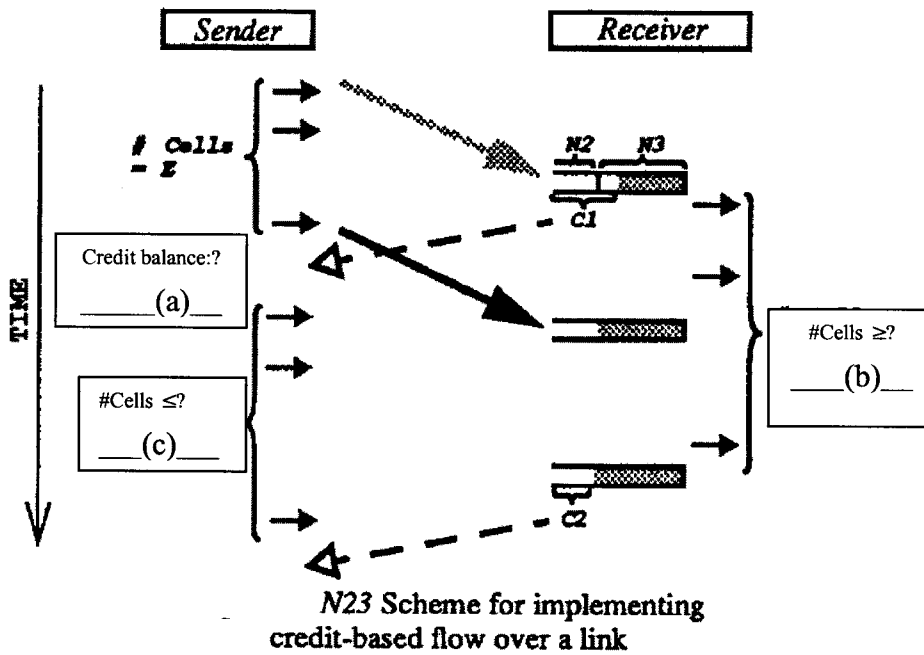i) Fill all three boxes (a, b, and c) in the figure shown below.
ii) What are the objectives of N2 and N3?

Figure 7 Figure used for question 5.3