Solution to HW6

13.1 (10 pts.)

1. It does not guarantee that a particular node will not be swamped with frames.
2. There is no good way of distributing permits where they are most needed.
3. If a permit is accidentally destroyed, the capacity of the network is inadvertently reduced.

13.3 (15 pts.)

a. We have a total load of $r_{total} = \sum_{i=1}^{5} r_i = 1.5$. The requirement is $\sum_{i=1}^{5} p_i r_i = r_{total} - C = 1.5 - 1.0 = 0.5$.

For all of the following, it is easily verified that $\sum_{i=1}^{5} p_i r_i = 0.5$
b. Same p_i for each sender. Each sender is penalized by the same percentage.
c. p_i is directly proportional to r_i. The rate of penalty is proportional to the load generated.
d. This is knows as a fair-share allocation. In this case the allowed flows are 0.1, 0.2, 0.2334, 0.2332, 0.2335. Thus, each source is given an equal share of the capacity, subject to the constraint that the share given to any source cannot exceed the rate generated by that source.
e. Punish the highest-rate sender.

13.4 (5 pts.)

The terms are roughly similar, but the mathematical definitions differ, so one would expect that the practical application of the two sets of concepts would produce different results.

13.5 (10 pts.)

a. For high RDF the response will be fast, potentially causing oscillations. If RDF is low then the response will be slow.
b. The response is very similar to part (a). Note that there is no difference in the mechanism if we put α = 1 – RDF.
We get Ratenew = Rateold Rateold x RDF= Rateold (1 – RDF) =Rateold x α
The rate of response will be reversed (as compared to part a above), i.e., when □ is high (close to 1) the response will be slow, but when α is low (closer to 0) then the response is fast.