1. R6

2. Discuss four (4) advantages for using UDP over using TCP. Mention at least two applications that use these different advantages of UDP.

3. TCP attacks: explain the TCP SYN flood attack, and suggest a solution.

4. R17

5. P13

6. P14

7. P21 [Extra points]

8. TCP vs. UDP interaction: If TCP flows share a bottleneck link with UDP flows, which type of the flows will end up: a- getting more bandwidth, b- suffering more losses.

9. P30

10. P37

11. Based on your understanding of explicit and implicit congestion signaling discuss why TCP’s performance in general degrades over wireless links? If the network provides explicit congestion signaling discuss modifications you would propose to TCP such that its performance improves over wireless networks. Discuss possible drawbacks and improvement of your initial solution above considering both wireless and wired links.

12. ATM ABR rate-controlled flow, starts with initial cell rate (ICR) of 16k cells/sec. The peak cell rate (PCR)=32k cells/sec, the minimum cell rate (MCR)=1k cells/sec, the maximum burst size (MBS) is 100k cells, and the RM cell rate is 1 cell/sec (these RM cells were received by the sender). The rate increase factor (RIF)=1/4, and the rate decrease factor (RDF)=1/4. The no increase (NI) bit was always ‘0’ in the RM cells, while the setting of the congestion indication (CI) bit in the consecutive RM cells was as follows: 0,0,0,0,1,1,1,1. Draw a graph showing the cell rate of the source against time with intervals of 1 sec, starting at time t=0 when the sender started with ICR, up to t=8 secs.
13. In ATM ABR congestion control the equation to increase the rate is given by:

\[ Rate_{\text{new}} = Rate_{\text{old}} - Rate_{\text{old}} \cdot RDF \]

where RDF is the rate decrease factor,

a. discuss how fast/slow does the sender respond to congestion for the various value of RDF.

b. If the equation was changed to \( Rate_{\text{new}} = Rate_{\text{old}} \cdot \beta \), do you think the response will be better or worse and why.

14. Argue for or against this statement (reason using examples as necessary): “Packets are lost only when network failures occur (e.g., a link goes down). But when the network heals (e.g., the failed link comes back up again), packets do not get lost.”