First Semester M.Tech. Degree Examination, June 2012
Computer Networks

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1   a.   Briefly explain the functions of each layer of internet architecture, with the help of a diagram. **(10 Marks)**

   b.   Calculate the total time required to transfer a 1.5 MB file in the following cases, assuming an RTT of 80 ms, a packet size of 1 KB and an initial $2 \times$ RTT of "hand – shaking" before dataare sent :
   i)   The bandwidth is 10 Mbps, and data packets can be sent continuously
   ii)   The bandwidth is 10 Mbps, but after we finish sending each data packet, we must wait one RTT before sending the next packet. **(04 Marks)**

   c.   Briefly discuss the different performance metrics of a network. **(06 Marks)**

2   a.   Explain switching and forwarding in the case of packet switched networks. **(04 Marks)**

   b.   For the network given in Fig. Q2(b), give the datagram forwarding table for each node. The links are labeled with relative costs ; tables should forward each packet via the lowest cost path to the destination. **(06 Marks)**
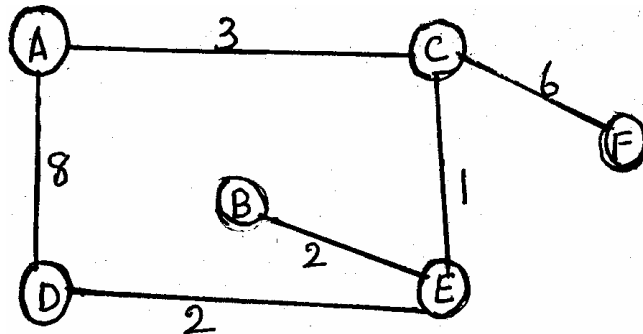

Fig. Q2(b)

   c.   Discuss with the help of an example how bridges use spanning tree algorithm to handle loops. **(10 Marks)**

3   a.   Briefly explain the packet formats, encapsulation and segmentation for AAL ¾. **(12 Marks)**

   b.   Suppose a TCP message contains 2048 bytes of data and 20 bytes of TCP header, and is passed to IP for delivery across two networks of the internet.
   i.   First network uses 14-byte headers, and has an MTU of 1024 bytes. Give the sizes and offsets of the sequence of fragments delivered to the network layer at the destination host
   ii.   Second network has 8 byte headers with an MTU of 512 bytes. Also find for this network the sizes and offsets of the fragments delivered at the destination host.
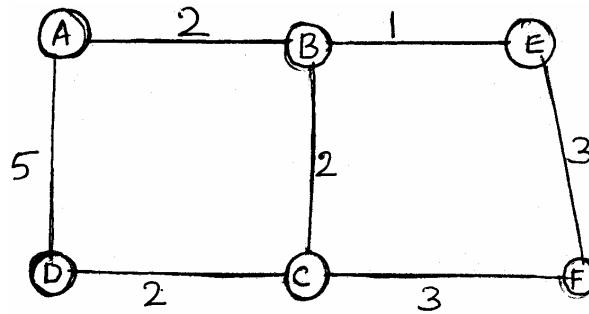   Assume IP headers of 20 bytes. **(08 Marks)**

4 a.

Fig. Q4(a)

For the network given in Fig. Q4(a), give the global distance – vector tables when
  i. Each node knows only the distance to its immediate neighbors
  ii. Each node has reported the information it had in the preceding step to its immediate neighbors. **(10 Marks)**
  b. What is MPLS? Explain how the packets are forwarded using MPLS. **(06 Marks)**
  c. What is subnetting? Explain subnet addressing for a class B IP address. **(04 Marks)**

5 a. Explain the TCP header format along with field specification. **(10 Marks)**
  b. Describe the working of a sliding window protocol, for TCP. **(04 Marks)**
  c. What is silly window syndrome? Discuss one algorithm which solves this problem. **(06 Marks)**

6 a. What is RPC? Explain the steps involved in making RPC. **(08 Marks)**
  b. Briefly explain the taxonomy of resource allocation. **(06 Marks)**
  c. Discuss the four queuing technique. **(06 Marks)**

7 a. What is congestion? Explain the causes of congestion. **(04 Marks)**
  b. Briefly explain the RED algorithm for congestion avoidance. **(08 Marks)**
  c. Discuss the RSVP protocol for integrated services. **(08 Marks)**

8 a. What is DNS? Explain how the name resolution takes place. **(08 Marks)**
  b. Discuss the SNMP protocol, in detail. **(08 Marks)**
  c. Write a note on overlay networks. **(04 Marks)**

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