

# COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)  
SHIVAJI NAGAR, PUNE - 411 005

## END Semester Examination

### (ET-14002) Computer Network

Branch: Electronics and TeleCommunication Engineering

Course: B.Tech

Semester: Sem VII

Year: 2014-2015

Max.Marks:60

Duration: 3 Hours Time:- 2 pm to 5 pm

Date:26/11/14

#### Instructions:

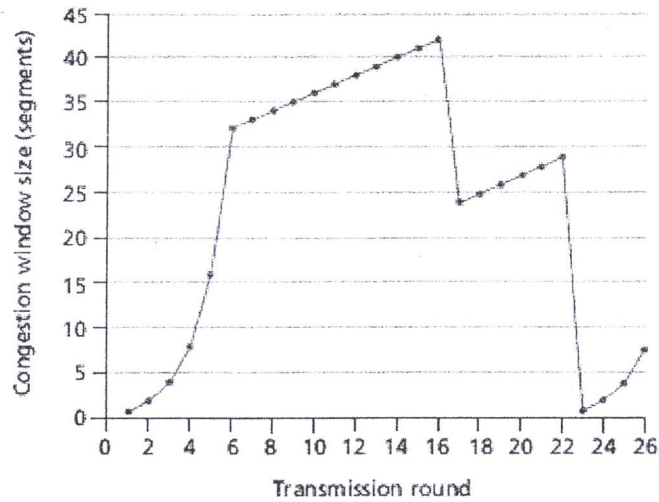
MIS No. 

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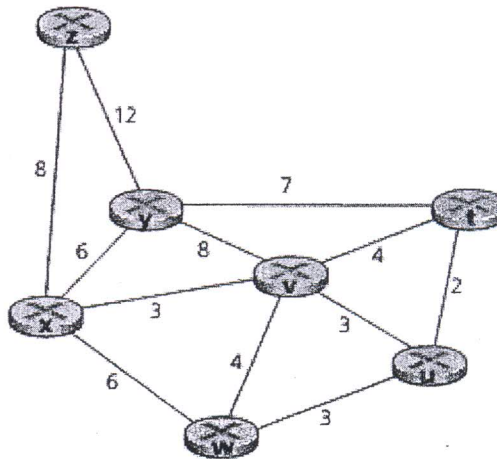
1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

- |  | Marks |
|--|-------|
| Q. 1 a. List six access technologies. Classify each one as home access, enterprise access, or wide-area wireless access.   | 2     |
| b. What advantage does a circuit-switched network have over a packet-switched network? What advantages does TDM have over FDM in a circuit-switched network?   | 2     |
| c. Some content providers have created their own networks. Describe Google's network. What motivates content providers to create these networks?   | 3     |
| d. How long does it take a packet of length 1,000 bytes to propagate over a link of distance 2,500 km, propagation speed $2.5 \times 10^8$ m/s, and transmission rate 2 Mbps? More generally, how long does it take a packet of length L to propagate over a link of distance d, propagation speed s, and transmission rate R bps? Does this delay depend on packet length? Does this delay depend on transmission rate? | 3     |
| Q. 2 a. Why do HTTP, FTP, SMTP, and POP3 run on top of TCP rather than on UDP?   | 2     |
| b. Describe how Web caching can reduce the delay in receiving a requested object. Will Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why?  | 4     |
| c. Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. What transport and application-layer protocols besides HTTP are needed in this scenario?  | 2     |

- d. Why HTTP is said to be Stateless protocol? Clearly distinguish between Non persistent and Persistent HTTP. 2
- Q. 3 a. Illustrate DNS recursive queries and iterative queries with suitable examples. 4
- b. Discuss IMAP protocol. 4
- c. We have seen that Internet TCP sockets treat the data being sent as a byte stream but UDP sockets recognize message boundaries. What is one advantage and one disadvantage of byte-oriented API versus having the API explicitly recognize and preserve application-defined message boundaries? 2
- d. Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? If so, how? 2
- Q. 4 a. Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. 2
- (i) How much data is in the first segment?
- (ii) Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgment that Host B sends to Host A, what will be the acknowledgment number?
- b. We have said that an application may choose UDP for a transport protocol because UDP offers finer application control (than TCP) of what data is sent in a segment and when. 4
- i. Why does an application have more control of what data is sent in a segment?
- ii. Why does an application have more control on when the segment is sent?
- c. Consider following graph of congestion window size. Assuming TCP Reno is the protocol experiencing the behavior shown above, answer the following questions. In all cases, you should provide a short discussion justifying your answer. 6
- a. Identify the intervals of time when TCP slow start is operating.
- b. Identify the intervals of time when TCP congestion avoidance is operating.
- c. After the 16th transmission round, is segment loss detected by a triple duplicate ACK or by a timeout?
- d. After the 22nd transmission round, is segment loss detected by a triple duplicate ACK or by a timeout?
- e. What is the initial value of ssthresh at the first transmission round?
- f. What is the value of ssthresh at the 18th transmission round?



- Q.5 a. Describe Router Architecture in brief. 2
- b. What are the two most important network-layer functions in a datagram network? What are the three most important network-layer functions in a virtual-circuit network? 2
- c. Suppose that routers were subjected to conditions that might cause them to fail fairly often. Would this argue in favor of a VC or datagram architecture? Why? 2
- d. Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes. 4



- E What are some of the possible services that a link-layer protocol can offer to the network layer? Which of these link-layer services have corresponding services in IP? In TCP? 2
- g. Suppose two nodes start to transmit at the same time a packet of length L over a broadcast channel of rate R. Denote the propagation delay between the two nodes as  $d_{prop}$ . Will there be a collision if  $d_{prop} < L/R$ ? Why or why not? 2
- h. Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address? 2

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