

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2727

Roll No.

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B.Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION 2012-13

DATA COMMUNICATION NETWORKS

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions.

1. Attempt any **FOUR** parts : **(5×4=20)**
 - (a) List the layers in the TCP/IP model, and give a brief explanation of each.
 - (b) What is packet-switching, and why is packet-switching relevant to the Internet ?
 - (c) What are the conceptual pieces of a data communications system ? Briefly explain.
 - (d) What is the difference between guided and unguided transmission ? Explain.
 - (e) Why is CSMA/CA needed in a wireless network ?
 - (f) Can a host have more than one IP address ? Explain.
2. Attempt any **FOUR** parts : **(5×4=20)**
 - (a) When a packet switch receives a distance-vector message from a neighbour, will the switch's forwarding table always change ? Explain.

- (b) What is the conceptual difference between IP and end-to-end protocols ? Explain.
- (c) List the features of UDP and calculate the size of the largest possible UDP message.
- (d) How does TCP handle packet loss ? Explain by giving a suitable example.
- (e) Name two technologies used to increase the speed of routers and switches.
- (f) List the major features of IPv6, and give a short description of each.

3. Attempt any **TWO** parts : (10×2=20)

- (a) How long does it take a packet of length 1,000 bytes to propagate over a link of distance 2,500 km, propagation speed 2.5×10^8 m/s, and transmission rate 2 Mbps ? More generally, how 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 ? Explain.
- (b) What is silly window syndrome ? If the TCP round-trip time, RTT, is currently 30 msec and the following acknowledgments come in after 26, 32 and 24 msec, respectively, what is the new RTT estimate using the Jacobson algorithm ? Use $\alpha = 0.9$.
- (c) What is congestion control ? Analyze the advantages and disadvantages of performing congestion control at the transport layer, rather than at the network layer.

4. Write short notes on any **TWO** of the following :

(10×2=20)

- (a) Routing Algorithms
- (b) IPv₆ Vs IPv₄
- (c) IEEE 802.11

5. Attempt any **FOUR** parts :

(5×4=20)

- (a) DNS uses UDP instead of TCP. If a DNS packet is lost, there is no automatic recovery. Does this cause a problem, and if so, how is it solved ?
- (b) Could IP be redesigned to use hardware addresses instead of the 32-bit addresses it currently uses ? Why or why not ?
- (c) A TCP entity opens a connection and uses slow start. Approximately how many round-trip times are required before TCP can send N segments ?
- (d) A TCP machine is sending full windows of 65,535 bytes over a 1-Gbps channel that has a 10-msec one-way delay. What is the maximum throughput achievable ? What is the line efficiency ?
- (e) Users view the Internet as a single network. What is the reality, and to what does a user's computer attach ?