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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013
COMPUTER SCIENCE AND ENGINEERING
V Semester
CS9305 DATA COMMUNICATION AND COMPUTER NETWORKS
(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. | A digital system is required to operate at 9600 bps. If a signal element encodes a 4-bit word, what is the minimum required bandwidth of the channel ?
2. | Differentiate between a codec and a modem.
3. | What are the 5 layers in an Internet protocol stack ? Which of these layers does a router possess ?
4. | How are the two classes of traffic – synchronous and asynchronous handled in FDDI ?
5. | A router has just received the following new IP addresses: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can the entries be aggregated? If so, to what? If not, why not?
6. | Which ICMP message helps to report about the congestion in a router?
7. | Suppose TCP operates over 125MB/sec link, assume TCP could utilize the full BW continuously, how long would it take the sequence number to wrap around completely?
8. | 4000 bytes-large data blocks are sent over a fiber link with a distance of 1000km using the sliding window protocol. Link bandwidth is 4Gbps, what is the delay-bandwidth product? What should be the size of the send window to keep the pipe full?
9. | Is it possible that an organization's web server and mail server have the same alias for a host name ? What would be the different RRs used in this case ?
10. | Why do HTTP, FTP, SMTP, POP3, and IMAP run on top of TCP rather than UDP ?

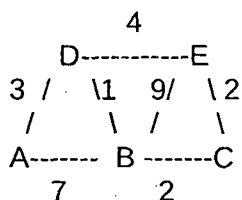
Part – B (5 x 16 = 80 marks)

11. (i) Discuss in detail about the working of the SMTP protocol, along with other companion protocols used to access mails, and send attachments. (10)
(ii) Suppose that a HTML file indexes three small objects on the same server. Neglecting transmission times, how much time Elapses with: non-persistent HTTP with no parallel TCP connections, non-persistent HTTP with parallel connections and persistent HTTP with pipelining ? (6)
 12. a) (i) Discuss in detail about the FHSS and DSSS techniques used to spread, data over a wider bandwidth. (10)
(ii) Consider a stream of binary data consisting of the sequence 111000100001100001, Draw the waveform for this sequence using NRZI, AMI, and Differential Manchester. (6)
- OR**
- b) (i) Discuss the various techniques used to send analog data on digital channels highlighting the advantages and drawbacks of each technique. (10)
(ii) Discuss in detail about the time division multiplexing techniques. (6)

13. a) (i) Explain the token ring protocol used in 802.5 standard. (10)
(ii) Explain the hidden node and exposed node problems that occur in wireless networks. How are they avoided in the 802.11 networks. (6)

OR

- b) (i) Discuss the transmission algorithm used in Ethernet. Why is the minimum size of the Ethernet frame fixed to 512 bits? (10)
(ii) Discuss the HDLC bit oriented protocol used to transmit frames in packet switched networks. (6)
14. a) (i) Design a subnet addressing scheme for our university with one class B address 150.20. Individual networks to be supported : CSE : 2 networks with 500 systems each, RCC – 2 networks with 1000 systems each, ECE – 1 network with 250 systems, Science block – 1 network with 250 systems, Other Engg faculty – 2 networks with 500 systems each, Hostels – 4 networks with 250 systems each. Show the entries to be used at the router (default and others). (10)
(ii) Explain link-state routing protocol using the following sample network (for E). (6)



OR

- b) (i) Discuss in detail about the BGP, an inter domain routing protocol. (10)
(ii) Compare IPv4 and IPv6 protocol and also discuss the salient features of IPv6 protocol. (6)
15. a) (i) What is meant by silly window syndrome in TCP ? How is it overcome at the sender side and receiver side, discuss the algorithms used. (10)
(ii) Discuss the state transition diagram of TCP connection **termination**. (6)

OR

- b) (i) Discuss in detail about the congestion avoidance mechanisms used in TCP. (10)
(ii) Consider transferring an enormous file of L bytes from host A to host B. Assume an MSS of 1460 bytes. What is the maximum value of L such that the TCP sequence numbers are not exhausted ? For this L, how long does it take to transmit a file over a 10 Mbps link? Assume that a total of 66 bytes of transport, network and data-link header are added to each segment, and ignore flow and congestion control. (6)