Code : 105315

2012 (A)

COMPUTER NETWORK

Time : 3 hours | *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **TEN** questions in this paper.*

*(iii) Attempt any **FIVE** questions.*

1. *(a)* What is a network? What do you mean by network protocol? Compare and contrast between TCP/IP and OSI/ISO protocol stack models.

(b) Discuss bus and mesh network topologies with proper illustration and real-life examples of each. 10+4

2. *(a)* Why is framing required at data-link layer? Explain character count method of framing. Discuss the pros and cons of this method of framing.

(b) The following character encoding is used in a data link protocol :

A : 01000111
B : 11100011
FLAG : 01111110
ESC : 11100000

Show the bit sequence transmitted (in binary) for the four character frames A B ESC FLAG when character count method of framing is used. 7+7

3. *(a)* What do you mean by sliding window protocol? Discuss Go-Back-N sliding window protocol in detail.

(b) How are sequence number and window size related in Go-Back-N sliding window protocol? Explain why window size cannot be same as maximum sequence number value. 7+7

4. Calculate the data that will be transmitted by sending machine for input data bit 11100101010, where agreed generator polynomial is $x^3 + x^2 + 1$ when CRC method of calculating checksum is used. Verify received data bits at the receiver end for error-free and with error when there is no error and when fourth bit is flipped in transmitted data respectively. 14

5. (a) What is SNMP? What does it stand for? Discuss, in detail, the protocol with proper illustrations and facts.

(b) What is FTP protocol? What does it stand for? Discuss, in detail, the protocol with proper illustrations and facts. 7+7

6. (a) Compare and contrast between hub and bridge devices in terms of usage, placing, working, advantages and disadvantages.

(b) Discuss CSMA/CD MAC protocol in detail. 7+7

7. (a) What do you mean by multiplexing, demultiplexing at transport layer? How are multiplexing and demultiplexing done at transport layer?

(b) Why is TCP called connection-oriented while UDP is connection-less? Consider two machines that use TCP as transport layer protocol for their communication.

Will the sending machine be able to send the data if the receiving machine is in power-off state? Justify your answer in either case. 7+7

8. (a) Draw a neat and clean diagram of Ethernet frame. Discuss the function of each of its header fields.

(b) Compare and contrast between working of circuit switching and packet switching. 7+7

9. (a) Discuss TCP transport layer protocol with a labeled diagram of TCP PDU in detail.

(b) What do you mean by 'switching at network layer'? What are the major categories of switches? Explain the working of each one of them in detail. 7+7

10. Write short notes on any *two* of the following : 7×2=14

(a) Adaptive and non-adaptive routing

(b) PPP

(c) Count to infinity problem

(d) Services provided by network layer

(e) HTTP

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