Course Code : CST 317 **CXDW/RW – 18 / 5058**

Fifth Semester B. E. (Computer Science and Engineering) Examination

COMPUTER NETWORKS

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry marks as indicated.

(2) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) Justify the need of layering in network architecture. Describe the design issues of chained layers of OSI model. 5(CO 1)

   (b) If the user wants to send a 2048 bytes message to another user, how the packets will be received in case of message sequence and byte stream scenario ? What are the types of services, provided by a layer to its upper layer ? Explain with example. 5(CO 1)

2. Solve any **Two** :

   (a) Indicate the advantages of fiber optic cable over copper cable and Explain how data is transmitted along a fiber optic cable. 5(CO 2)

   (b) With respect to following points describe the twisted pair cable :

      (i) Physical Description.

      (ii) Application.

      (iii) Transmission characteristics. 5(CO 2)

   (c) Discuss in detail the wireless propagation modes. 5(CO 2)

3. (a) Along with the frame format of HDLC, discuss in detail the kinds of frames in HDLC. 5(CO 3)

   (b) If the message bits are 1101001101000110. Calculate the check bits needed to be sent with frame usng hamming distance error correction algorithm. Assume even parity. 3(CO 4)

(c) Compute the minimum size of the sending window if sliding window ARQ is to be used with a transmission efficiency of 100% under error–free conditions. Assume that the user data frame size is 1200 bytes, link rate is 1 Mbps and round-trip propagation delay is 15 ms. Ignore ACK frame size, header/CRC overhead, and processing delays. 2(CO 3)

4. Solve any **Two** :

(a) When the channel is shared by all the stations on the network, how does random access strategy tries to solve the chaos ? How many protocols are defined under random access ? Discuss the protocols and their throughput equations. 5(CO 3)

(b) Given are the following chip sequences :

A:(–1–1–1+1+1–1+1+1)

B:(–1–1+1–1+1+1+1–1)

C:(–1+1–1+1+1+1–1–1)

D:(–1+1–1–1–1–1+1–1)

The stations want to transmit the following bits: A: 1, B:0, C:0, D:–. What is the resulting chip sequence ? 5(CO 3)

(c) Produce a sketch diagram to show the fields of a frame as used by Ethernet / IEEE 802.3. Why a frame with a length less than 64 bytes is not allowed on an IEEE 802.3 network ? 5(CO3)

5. (a) How line utilization is calculated for sending a choke packet ? If line utilization crosses a threshold, indicate the behavior of sender and receiver. How choke packet mechanism helps in reducing congestion ? 5(CO 3)

(b) Solve any **One** :

(i) How does distance vector routing protocol works ? Explain with example. 5(CO 4)

(ii) Computer A has 19.5 MB to send on a network and transmits the data in a burst 6 Mbps. The maximum transmission rate across routers in the network is 4 Mbps. If Computer A's transmission is shaped using a leaky bucket, how much capacity must the queue in the bucket hold not to discard any data? 5(CO 4)

6 (a) Solve any **One** :

(i) What is the significance of flags in a TCP header ? Discuss all the 8 bit fields in a TCP header. 5(CO 3)

(ii) If the TCP round trip time is 15 msec and acknowledgements come after 25, 36 and 20 msec respectively. What is the new RTT estimate ? Use alpha = 0.7. 5(CO 3)

(b) How Transport layer manages crash recovery ? 5(CO 3)