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***B.Tech. Degree VI Semester Special Supplementary Examination  
January 2019***

**CS 15-1601 COMPUTER NETWORKS  
(2015 Scheme)**

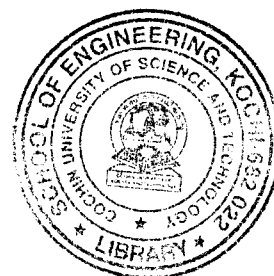
Time : 3 Hours

Maximum Marks : 60

**PART A  
(Answer *ALL* questions)**

(10 × 2 = 20)

- I. (a) In one of the pairs of protocols given below, both the protocols can use multiple TCP connections between the same client and the server. Which one is that?  
 (i) HTTP, FTP (ii) HTTP, TELNET (iii) FTP, SMTP (iv) HTTP, SMTP
- (b) Explain any two application layer protocols.
- (c) Explain RPC.
- (d) How is congestion control different from flow control?
- (e) Compare TCP and UDP.
- (f) Draw and explain Ethernet frame format.
- (g) Differentiate circuit switching and packet switching.
- (h) What are the basic functions of datagram based network layer? What additional functions are provided by VC-based network layer?
- (i) Compare CRC checksum for the message 1101011011 using the generator polynomial  $x^4 + x^2 + 1$ .
- (j) In an Ethernet local area network, which one of the following statements is TRUE?  
 (i) A station stops to sense the channel once it starts transmitting a frame.  
 (ii) The purpose of the jamming signal is to pad the frames that are smaller than the minimum frame size.  
 (iii) A station continues to transmit the packet even after the collision is detected.  
 (iv) The exponential back off mechanism reduces the probability of collision on retransmissions.



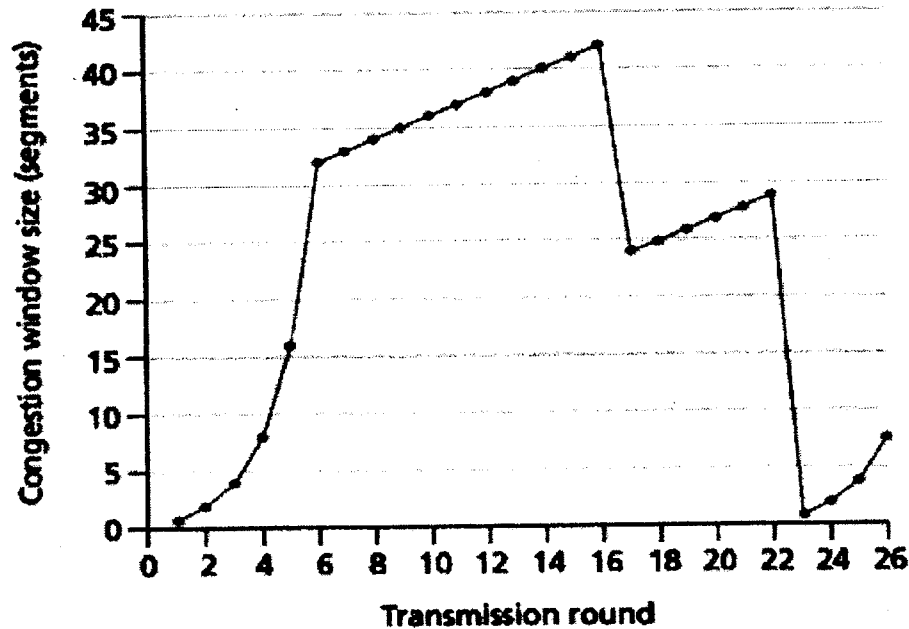
**PART B**

(4 × 10 = 40)

- II. (a) Discuss TCP/IP protocol suit on the basis of protocol layering principles. (6)  
 (b) Elaborate the persistent and non persistent connections used in http. (4)
- OR**
- III. (a) What are the resource records in DNS? What are the type of queries in DNS? (6)  
 (b) Why is it said that FTP sends control information "out of band"? (4)

(P.T.O.)

- IV. (a) Describe why an application developer may choose to run its application over UDP rather than TCP. (2)
- (b) The Transmission Control Protocol uses a method called congestion control to regulate the traffic entering the network. The behavior of TCP congestion control can be represented as a graph in which the x-axis indicates the time and the y-axis indicates congestion window size. Please use the graph shown below to answer the following questions. Note that the graph does not explicitly show timeouts, but you should be able to figure out when timeouts happened based on the events shown (8)



- Identify the intervals of time when TCP slow start is operating. Give two reasons why slow start is used.
- Identify the intervals of time when TCP congestion avoidance is operating. Why should congestion avoidance be used instead of slow start during these intervals?
- Identify the intervals of time when TCP fast retransmission is used. Please explain what fast retransmission does and how it is triggered.

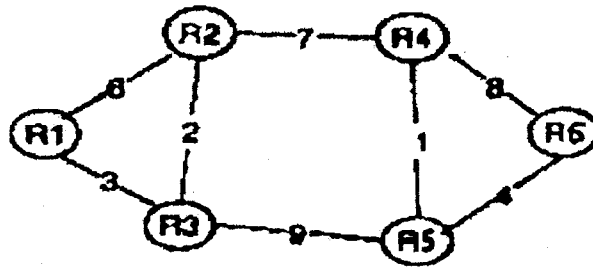
OR

- V. (a) Describe the various fields of TCP segment header. (4)
- (b) How is the timeout estimation done in TCP? (3)
- (c) How is connection established and closed in TCP? (3)
- VI. (a) Compare Link state and distance vector routing. (5)
- (b) Explain any two services of the network layer. (5)

OR

(Contd...3)

- VII. (a) Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the following diagram. (6)



All the routers use the distance vector based routing algorithm to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbor with the weight of the respective connecting link. After all the routing tables stabilize, how many links in the network will never be used for carrying any data?

- (b) What are the different classes of IP address and what is the network mask of each class? (2)
- (c) What is the network ID of IP address 172.16.40.0/20? (2)
- VIII. (a) What is the need of sliding window protocols? (5)
- (b) How can you compare pure ALOHA and slotted ALOHA? (5)
- OR
- IX. (a) Compare ISDN and B-ISDN. (4)
- (b) Describe the structure of Ethernet frame and explain its properties. (6)

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