

(3 Hours)

## Data Communication & Network

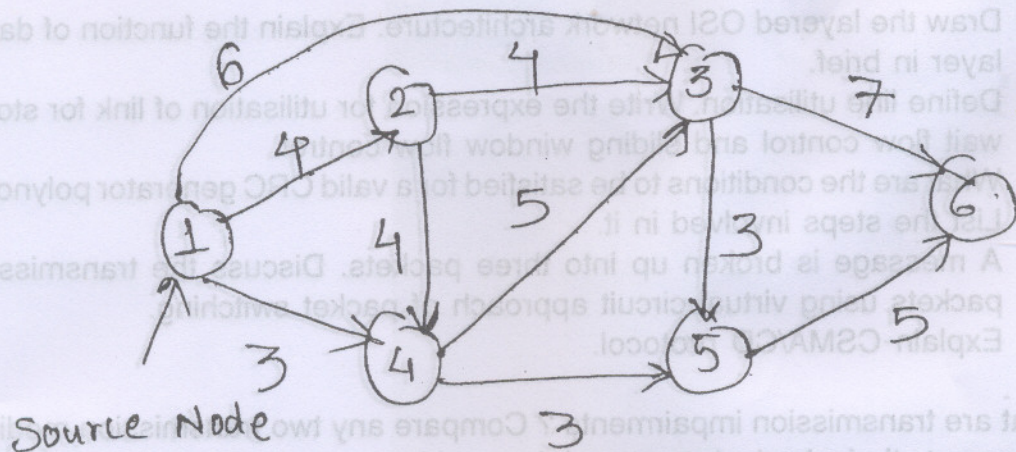
[Total Marks : 100  
12/12/09]

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions out of remaining **six** questions.  
 (3) Assume **suitable** data if **necessary**.

1. Answer any **four** questions :- 20
  - (a) Draw the layered OSI network architecture. Explain the function of data link layer in brief.
  - (b) Define line utilisation. Write the expression for utilisation of link for stop and wait flow control and sliding window flow control.
  - (c) What are the conditions to be satisfied for a valid CRC generator polynomial? List the steps involved in it.
  - (d) A message is broken up into three packets. Discuss the transmission of packets using virtual circuit approach of packet switching.
  - (e) Explain CSMA/CD protocol.
  
2. (a) What are transmission impairments? Compare any two transmission media with reference to their physical structure / characteristics, applications and performance. 10
- (b) With a suitable sketch explain the connection phases in point to point protocol (PPP), also explain supported sets of protocols to make a PPP a powerful protocol. 10
  
3. (a) Explain different types of ARQ techniques. Compare their merits and demerits. 10
- (b) Sketch HDLC frame structure with respect to it, explain - 10
  - (i) Piggybacking
  - (ii) Bit Stuffing
  - (iii) Data transfer modes
  - (iv) Types of frames in HDLC.
  
4. (a) Two neighbouring nodes A and B use Go-Back-N ARQ with a 3 bit sequence number. Assuming that A is transmitting and B is receiving, show the window position and frame flow for the following sequence of events :- 10
  - (i) Initial Position. Before A sends any frames window at A and B
  - (ii) After A sends 0, 1, 2 and B acknowledge 0, 1 and the ACK are received by A.
  - (iii) A sends frames 3, 4 and then receive REJ3 from B.
  - (iv) A sends frames 3, 4, 5, 6. The acknowledgement RR7 send by B is lost and A does not receive it.

How would A react? Indicate frame flow diagram.
- (b) Explain with the help of neat sketch the frame format of frame relay. Also give the detail of following :- 10
  - (i) FECN
  - (ii) BECN
  - (iii) EA
  - (iv) DE

5. (a) Explain Leaky bucket and Token bucket algorithm in detail. 10  
 (b) Apply Dijkstra's and Bellman Ford Algorithm to the given network and find the least cost path between the source node 1 to all other nodes :- 10



6. (a) Explain ATM adaptation layer and ATM cell in detail. 10  
 (b) Explain the following :- 10  
 (i) ISDN Channels and Architecture  
 (ii) ISDN User interfaces.
7. Write short notes on (any **four**) :- 20  
 (a) FDDI  
 (b) IEEE 802.3  
 (c) SS7  
 (d) DTE-DCE interface  
 (e) TCP/IP protocol.