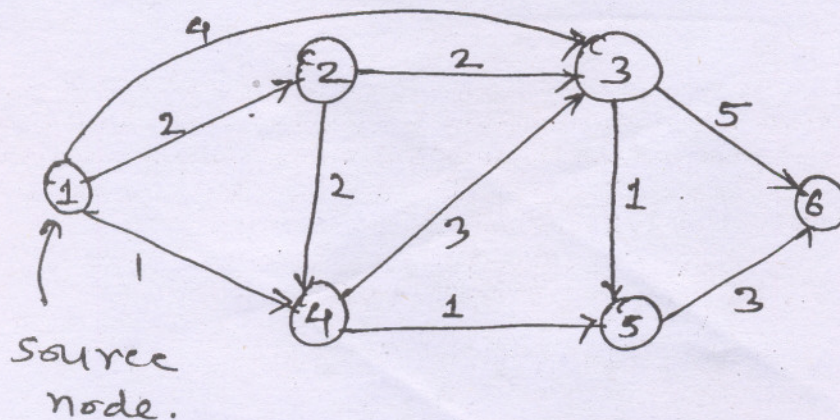


(2) Attempt any **four** questions out of the remaining **six** questions.  
 (3) Assume **suitable** data wherever **required**.

1. Attempt any **four** questions :— 20
  - (a) What are the transmission impairments ? Explain each briefly.
  - (b) What are the three types of frames supported by HDLC ? Describe each in detail.
  - (c) Distinguish between Circuit switching and Packet switching.
  - (d) What are the advantages of statistical TDM over synchronous TDM ?
  - (e) What are the functions of Data Link Layer in the OSI Model.
  
2. (a) Draw the block diagram of a TDM-PCM system that will accommodate four 14.4 kbps synchronous digital inputs and two analog inputs with bandwidth 4 KHz each. Assume that the analog inputs will be encoded into 4 bit PCM words. What is the required capacity for the TDM Link ? 10
  - (b) Explain the pulse stuffing in TDM. 5
  - (c) What is ADSL technology ? Explain in detail. 5
  
3. (a) A CRC is constructed using the CRC-16 polynomial. Determine the CRC if data bit sequence is 1010101010101. Also draw the shift register circuit for the same. 10
  - (b) Calculate the maximum link utilisation of the network specified below for the following cases : 6
    - (i) Stop-and-Wait flow control
    - (ii) Sliding window flow control with window sizes of 7 and 15.

Link specifications :—

Frame length	= 1200 bits
Velocity of propagation	= $2 \times 10^8$ m/sec.
Link distance	= 16 km
Data rate	= 20 mbps.
  - (c) Compare Stop-and-Wait flow control with sliding window flow control. 4
  
4. (a) Draw HDLC frame format. Explain each frame in detail. Also explain : 10
  - (i) Data Transparency
  - (ii) Data transfer modes in HDLC.
  - (b) Compare Go-back-N ARQ and selective repeat ARQ. 5
  - (c) Explain architecture of SS7. 5
  
5. (a) 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 :—



- (b) Explain different routing techniques used in packet switched networks.
  
6. (a) Explain in detail :
  - (i) ATM adaption layer
  - (ii) ATM logical connections.
- (b) Explain the following :
  - (i) ISDN channels
  - (ii) ISDN user interfaces.
- (c) List the advantages of frame relay with respect to X.25.
  
7. Write a short notes on (any **four**) :—
  - (a) Channel signalling techniques in circuit switching
  - (b) Token Ring
  - (c) FDDI
  - (d) Congestion control techniques
  - (e) Spanning Tree Algorithm.