



**Examination : First Sessional**

**Seat No. :**

**Date : 22/01/2016**

**Day : Friday**

**Time : 11:00 to 12:15**

**Max. Marks : 36**

**INSTRUCTIONS:**

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

**Q.1 Do as directed.**

**[12]**

- (a) In the following pairs of OSI protocol layer/sub-layer and its functionality, the INCORRECT pair is **[02]**
- (A) Network layer and Routing  
(B) Data Link Layer and Bit synchronization  
(C) Transport layer and End-to-end process communication  
(D) Medium Access Control sub-layer and Channel sharing
- (b) A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. **[02]**  
If the output bit-string after stuffing is 01111110011110010101111110, then the input bit-string is
- (A) 0111110100  
(B) 011110101  
(C) 0111100101  
(D) 011110101
- (c) 1) Which of the following devices translates dissimilar network protocols? **[02]**  
(A) Router (B) Repeater (C) Switch (D) Gateway  
2) The Hamming distance between 101110 and 010011 is=\_\_\_
- (d) Explain two dimensional parity check with example. **[02]**
- (e) The vulnerable time in Pure ALOHA =\_\_\_ and slotted ALOHA=\_\_\_\_. Why they are different? **[02]**
- (f) Consider a CSMA/CD network that transmits data at a rate of 100 Mbps (10<sup>8</sup> bits per second) over a 1 km (kilometer) cable with no repeaters. If the minimum frame size required for this network is 1250 bytes, what is the signal speed (km/sec) in the cable? **[02]**

**Q.2 Attempt Any Two of following questions.**

**[12]**

- (a) Station A needs to send a message consisting of 9 packets to Station B using a sliding window (window size 3). All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B using Go back N and Selective repeat ARQ sliding window protocol. **[06]**
- (b) The message 11001001 is to be transmitted using the CRC polynomial  $x^3 + 1$  to protect it from errors. **[06]**  
1) The message that should be transmitted is:  
2) How does receiver check the error in received message?
- (c) Explain different types of cable used in network communication **[06]**

**Q.3 Attempt following questions**

**[12]**

- (a) Explain difference between the OSI model and the TCP/IP model. Discuss Network layer and Transport layer functionality in brief. **[06]**
- (b) The distance between two stations M and N is L kilometers. All frames are K bits long. The propagation speed (or velocity) is (1/t) km/sec. Let R bits/second be the **[06]**

channel capacity. Assuming that processing delay is negligible, Find the equation for minimum number of bits for the sequence number field in a frame for maximum utilization, when the sliding window protocol is used.

**OR**

**Q.3 Attempt following questions**

- (a) Since it is a network that uses switch, every packet goes through two links, one from source to switch and other from switch to destination. Since there are 10000 bits and packet size is 5000, two packets are sent. Transmission time for each packet is  $5000 / 1077$  bits per second links. Each link has a propagation delay of 20 microseconds. The switch begins forwarding a packet 35 microseconds after it receives the same. If 10000 bits of data are to be transmitted between the two hosts using a packet size of 5000 bits, the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in microseconds is [12]  
[03]
- (b) Station A uses 32 byte packets to transmit messages to Station B using a sliding window protocol. The round trip delay between A and B is 80 milliseconds and the bandwidth on the path between A and B is 128 kbps. What is the optimal window size that A should use? [03]
- (c) Explain CSMA/CD. Why it cannot be used in wireless network? [06]