Indian Institute of Information Technology-Allahabad

C1 Review Test

B.Tech. (IT & ECE) 4th Semester

Computer Networks (Code: ICNE532C)

Time: 2 Hour **MM: 80**

Note: Attempt all questions.

1. Multiple choice questions. **[20 Marks]**

i. Which of the following is/are NOT (a) layer(s) in TCP/IP protocol stack?

(a) Application (b) Session (c) Transport (d) Internet (e) Physical

ii. Which of the following modulation methods can have higher bit rates than the baud rate?

(a) Frequency Modulation (b) Amplitude Modulation (c) Phase Modulation – 2 Phase method
(d) Phase Modulation – 4 Phase method (e) Pulse Code Modulation

iii. Which of the following indicates the increasing order of accuracy in error detection?

(a) CRC, Single Parity, Block Sum Check (b) Block Sum Check, CRC, Single Parity
(c) Single Parity, CRC, Block Sum Check (d) Single Parity, Block Sum Check, CRC
(e) CRC, Block Sum Check, Single Parity

iv. Identify the unequal pair(s).

(a) Physical Address – MAC Address (b) IP Address – Logical Address
(c) Ethernet – IEEE 802.4 (d) Token Bus – IEEE 802.5
(e) Serial port – COM1

v. The following two bit strings show the transmitted and received bit patterns over a noisy serial data link.

Transmit: 01001011101000101101110011
Receive: 01011001101001101111110011

What is the length of the longest error burst?

(a) 4 (b) 6 (c) 16 (d) 10 (e) 5

vi. The check bits C_1, C_2 and C_3 of a Hamming code are correctly positioned in

(a) $D_1C_1C_2D_2D_3C_3$. (b) $C_1C_2\ D_1D_2D_3C_3$. (c) $C_3D_3C_2D_2C_1D_1$.
(d) $C_1D_1C_2D_2C_3D_3$. (e) $C_1C_2D_1C_3D_2D_3$.

vii. The following two tables indicates the different types of transmission media and their respective characteristic features:

1	Coaxial cables
2	UTP cables
3	Fibre Optic cables
4	Micro wave cables
5	STP cables

A	Unbounded medium
B	Shield as a metal foil
C	Twisted pair wires
D	Good for very high speed
E	Use of BNC connectors

The correct order(s) of A to E which match(es) items 1 to 5 respectively is/are

(a) EDACB. (b) BCDAE. (c) ECDAB.

(d) CASED. (e) BADEC.

viii. Which of the following is a/are correct statement(s) with respect to the frequency components of a digital signal?

(a) As the frequency increases the amplitude decreases.

(b) As the frequency decreases the amplitude increases.

(c) As the amplitude decreases the frequency increases.

(d) There are an infinite number of frequency components.

(e) In many cases, the very high frequency components can be ignored.

ix. With respect to Circuit Switching and Packet Switching, which of the following statement(s) is/are incorrect?

(a) In circuit switching after data transfer begins, no busy conditions take place.

(b) In packet switching, each packet of the same message must follow the same route.

(c) In circuit switching, the packets of the same message are forwarded via different routes.

(d) In packet switching, each packet must contain the addressing information.

(e) In circuit switching, a circuit must be established on the network prior to the data transfer.

x. Flow Control is employed in data communications

(a) Because the transmitter and the receiver may not be able work at the same speed.

(b) Because the receiver buffer capacity is high in new computers.

(c) In a dynamic fashion using the sliding window protocol especially at higher protocol layers.

(d) Because the communication channels are not always error free.

(e) To ensure that all transmitted frames are received in the order in which they have been sent.

2. We need to send 280 kbps over a noiseless channel with a bandwidth of 25 kHz. How many signal levels do we need? **[5 Marks]**

3. The SNR is often given in decibels. Assume that SNR (dB) is 34 and the channel bandwidth is 5 MHz. Calculate the maximum theoretical channel capacity of the channel in bits/second. **[5 Marks]**

4. Explain clearly the responsibilities and the list protocols for each layer of ISO-OSI reference model. How OSI reference model is different from TCP/IP reference model? **[10 Marks]**

5. Assume that the voltage level at time t = 0 is high, show Manchester and HDB3 encoding for the following bit stream 101001100000000010. Why net DC component is undesirable in the encoding techniques? **[10 Marks]**

6. What MAC algorithm used in IEEE 802.3 networks? Explain using a flowchart? Distinguish between 1-persistent and p-persistent and non-persistent CSMA. Why is Ethernet's binary exponential back-off scheme superior to a p-persistent scheme for any fixed p? Why the maximum and minimum frame size is defined for Ethernet frame? **[10 Marks]**

7. Consider an error-free 1024-kbps channel used to send 512B data frames in one direction, with very short acknowledgements coming back the other way. Assume a propagation delay of 50msec. **[10 Marks]**

(a) What should be the size of Sender's Window and number of bits required for the sequence number to attain maximum utilization of channel capacity

(b) What is the maximum throughput for a window size of 1, 7, 15, 127, and 255?

(c) At what minimum window size can the protocol run at the full rate of the channel?

8. Given a sender-receiver pair using Hamming Codes for single bit error correction and the binary message 1100010001 at the sender, what is the actual message transmitted including the parity bits (show your calculation)? Demonstrate error correction mechanism for the given message? **[10 Marks]**

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