Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

CS3CO18/CS3CO28/OE00044 Data Communication

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Calculate the Nyquist rate for sampling when a continuous time signal is given by x(t) = 5 cos 100πt +10 cos 200πt -15 cos 300πt **1**

(a) 300Hz (b) 600Hz (c) 150Hz (d) 200Hz

ii. What is the main difference between synchronous and asynchronous transmission? **1**

(a) Band width required is different.

(b) Pulse height is different.

(c) Clocking is derived from the data in synchronous transmission.

(d) Clocking is mixed with data in asynchronous transmission.

iii. The minimum bandwidth of Manchester and differential Manchester is ____ that of NRZ. **1**

(a) The same as (b) Twice

(c) Thrice (d) None of these

iv. Huffman coding, run-length coding are examples for_____ **1**

(a) Lossy compression (b) Lossless compression

(c) Transmission (d) Pixel

v. Most packet switches use this principle _____ **1**

(a) Stop and wait (b) Store and forward

(c) Both (a) and (b) (d) Stop and forward

vi. If one link fails, only that link is affected. All other link remains active. Which topology does this? **1**

(a) Mesh Topology (b) Star Topology

(c) Bus Topology (d) Hybrid Topology

P.T.O.

vii. UDP is _____ protocol. **1**
(a) Connection Oriented. (b) Connectionless
(c) Neither (a) and (b) (d) Both (a) and (b)

viii. Networking Hardware Address is referred with _____ **1**
(a) IP address
(b) MAC address
(c) NIC
(d) Organizationally Unique Identifier

ix. How error detection and correction is done? **1**
(a) By passing it through equalizer
(b) By passing it through filter
(c) By amplifying it
(d) By adding redundancy bits

x. Range of possible sequence numbers of Go-Back-N Protocol which is concern of receiver is called the **1**
(a) Sender sliding window (b) Pipelining at the sender
(c) Pipelining at the receiver (d) Receiver sliding window

Q.2 i. What is attenuation? Define channel capacity? **2**

ii. If a binary signal is sent over 3 KHz channel whose signal-to-noise ratio is 20dB, what is the maximum achievable data rate? **3**

iii. Compare Optical fibre communication over twisted pair on following points: **5**
(a) Speed (b) Attenuation
(c) Cost (d) Maintenance
(e) Devices used.
Explain each point in brief.

OR iv. List out causes of impairment in data communication. Explain each with suitable example and diagram. **5**

Q.3 i. For the bit stream 01001110, sketch the waveform for each of the codes- NRZI, NRZ-L, Manchester and Differential Manchester. Assume that the signal level for the preceding bit for NRZI and NRZ-L was high. **4**

ii. Compress "A_DEAD_DAD_CEDED_A_BAD_BABE_A_BEADED_A BACA_BED". using Huff Man coding technique. **6**

OR iii. How Frequency Division Multiplexing is different from Time Division Multiplexing. Explain Statistical Multiplexing Time Division Multiplexing technique with suitable example. **6**

Q.4 i. Compare circuit switching with packet switching on any eight parameters. **4**

ii. How implementation of connectionless service is different from connection oriented service. Explain with routing table for each node. **6**

OR iii. Discuss below mentioned topologies with suitable diagram and its application:- **6**
(a) RING (b) STAR (c) BUS (d) MESH

Q.5 i. Discuss the function of **4**
(a) Data Link Layer
(b) Network Layer
(c) Transport Layer
(d) Application in OSI model of networking.

ii. Differentiate between Logical address, Physical Address and Port Address. Discuss with suitable example and its application. **6**

OR iii. How Switch is different from Hub? What is the role of router in Networking? Is Gateway differs from Firewall, justify your answer? **6**

Q.6 Attempt any two:

i. A bit pattern 100100 was sent over a noisy channel and 1101 is used as a check bit. Demonstrate using CRC method how error detection can be made on sender and receiver side. **5**

ii. What is piggybacking? How pipelining improves the utilization of a channel. Calculate the line utilization if the channel capacity is b bits/sec, the frame size L bits, and the round-trip propagation time is R sec. **5**

iii. Explain **5**
(a) A sliding window protocol using go back n.
(b) HDLC protocol.

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Marking Scheme

CS3CO18/CS3CO28/OE00044 Data Communication

Q.1 i. Calculate the Nyquist rate for sampling when a continuous time signal is given by x(t) = 5 cos 100πt +10 cos 200πt -15 cos 300πt **1**
(a) 300Hz

ii. What is the main difference between synchronous and asynchronous transmission? **1**
(c) Clocking is derived from the data in synchronous transmission.

iii. The minimum bandwidth of Manchester and differential Manchester is ____ that of NRZ. **1**
(b) Twice

iv. Huffman coding, run-length coding are examples for_____ **1**
(b) Lossless compression

v. Most packet switches use this principle _____ **1**
(c) Both (a) and (b)

vi. If one link fails, only that link is affected. All other link remains active. Which topology does this? **1**
(b) Star Topology

vii. UDP is _____ protocol. **1**
(b) Connectionless

viii. Networking Hardware Address is referred with _____ **1**
(b) MAC address

ix. How error detection and correction is done? **1**
(d) By adding redundancy bits

x. Range of possible sequence numbers of Go-Back-N Protocol which is concern of receiver is called the **1**
(d) Receiver sliding window

Q.2 i. Attenuation 1 mark **2**
Channel capacity 1 mark

ii. What is the maximum achievable data rate **3**
Stepwise marking

iii. Compare Optical fibre communication over twisted pair on following points: 1 mark for each (1 mark * 5) **5**

OR iv. Any two causes of impairment in data communication **5**
Explanation 1 mark for each (1 mark * 2) 2 marks
Diagram 1 mark for each (1 mark * 2) 2 marks
Example 0.5 mark for each (0.5 mark *2) 1 mark

Q.3 i. For the bit stream 01001110, sketch the waveform for each of the codes- NRZI, NRZ-L, Manchester and Differential Manchester. **4**
1 mark for each code (1 mark * 4)

ii. Transmission code 4 marks **6**
Receiving decoding 2 marks

OR iii. Frequency Division Multiplexing is different from Time Division Multiplexing. **6**
At least two difference 1 mark for each (1 mark *2) 2 marks
Diagram 1 mark
Statistical Multiplexing Time Division Multiplexing technique
Explanation 2 marks
Example 1 mark

Q.4 i. Compare circuit switching with packet switching on any eight parameters **4**
0.5 mark for each parameter (0.5 mark * 8)

ii. Implementation of connectionless service is different from connection-oriented service. **6**
At least six points 0.5 mark for each (0.5 mark * 6) 3 marks
Routing table for each node.
1.5 mark for each (1.5 mark * 2) 3 marks

OR iii. Discuss below mentioned topologies with suitable diagram and its application: - **6**
1 mark for each topology's explanation
(1 mark * 4) 4 marks
0.5 mark for each diagram (0.5 mark * 4) 2 marks

Q.5 i. Function of each 1 mark (1 mark * 4) **4**

ii. Differentiate between Logical address, Physical Address and Port Address. **6**
Difference 2.5 marks
Example 2.5 marks
Its application. 1 mark

OR	iii.	How Switch is different from Hub	2 marks	**6**
		Role of router in Networking	2 marks	
		Is Gateway differs from Firewall	2 marks	
Q.6		Attempt any two:		
	i.	Sender side code	3 marks	**5**
		Receiver side.	2 marks	
	ii.	Piggybacking	2 marks	**5**
		Pipelining improves the utilization of a channel	2 marks	
		Calculate the line utilization	1 mark	
	iii.	Explain		**5**
		(a) A sliding window protocol using go back n.	2.5 marks	
		(b) HDLC protocol.	2.5 marks	

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