

**SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA**  
**School of Electronics & Communication Engineering**  
**B. Tech. (ECE) 5<sup>th</sup> Semester Minor Examination (Odd) 2019-20**

Entry No:

1 7 B E C 0 3 3

Date: 30<sup>th</sup> September 2019

Total Number of Pages: 02

Total Number of Questions: 14

Course Title: Communication & Data Networks

Course Code: ECL 3100

**Time Allowed: 1 Hour & 30 Minutes**

**Max Marks: 30**

Instructions / NOTE

- Attempt All Questions.
- Questions 1 to 10 are MCQs. MCQs may have multiple answers. Choose your options wisely.

**1. Functions of Data link layer is/are:**

[1x10=10 marks]

- Provides communication between personal computer & public network.
- Responsible for maintaining data integrity between transmitter & receiver.
- Offers reliable channel for data transmission.
- Offers protocols for error detection & correction.
- Defines addressing between source & destination.

**2. In OSI Model. The Communication Sub-net layer/layers is/are:**

- Physical layer
- Application layer
- Data link layer
- Network layer
- All of the above

**3. In Data communication, commonly used signal/signals is/are:**

- Periodic analog signals & periodic digital signals
- Periodic analog signals & non periodic digital signals
- Non periodic analog signals & periodic digital signals
- Non periodic analog signals & non periodic digital signals
- All of the above

**4. Transfer of data from source to destination involves following agent/agents:**

- Frames
- Processes
- Stations
- Networks
- Packets

**5. Speed range for IEEE 802.3u is/are:**

- 1 Mbps to 10 Mbps
- 20 Mbps to 50 Mbps
- 80 Mbps to 100 Mbps
- 200 Mbps to 1000 Mbps
- 250 Mbps to 500 Mbps

**6. Find the appropriate signaling method:**

- Baseband for digital signaling & Broadband for analog signaling.
- Broadband for digital signaling & Baseband for analog signaling.

- c) Broadband for both analog & digital signaling
- d) Baseband for both analog & digital signaling
- e) All of the above options are possible.

7. In Frame format, Preamble is:

- a) used to determine which type of protocol the frame has delivered
- b) used to synchronize receiver before actual data is sent
- c) Total frame length of preamble is of 8 Bytes
- d) Used for error detection & correction
- e) Used to determine the length of body of the frame

8. Function/functions of ARP is/are:

- a) Serves as mapping from high level IP address to low level MAC address
- b) Distributes the power consumed by each station present in the network
- c) ARP request is broadcast but ARP reply is unicast
- d) ARP request & reply packet is encapsulated within an Ethernet frame
- e) Used to determine the collision in the network

9. Repeater is used:

- a) for connecting different segments of LAN at physical level
- b) for connecting different LANs at network level
- c) acts as multi-port repeater
- d) used to separate collision domains
- e) used for filtering traffic

10. What is the use of Cyclic Redundancy Check (CRC) field in MAC frame:

- a) it check whether a transmission error has occurred
- b) it checks whether a logical ring has established
- c) it checks whether the token is available in the ring
- d) it checks whether the transmission medium is free
- e) All of the above

11. A speech signal, band limited to 4 kHz & peak voltage varying between +5 V & -5 V, is sampled at the Nyquist rate. Each sample is quantized & represented by 8 bits. [3+2=5 marks]

a) If the bits 0 & 1 are transmitted using bipolar pulses, find the minimum bandwidth required for distortion free transmission?

b) Assuming the signal to be uniformly distributed between its peak to peak value, find the signal to noise ratio at the quantizer output?

12. A communication system has channel of bandwidth 2 MHz and the SNR of this channel is 1023. Find its appropriate bit rate & signal level? [2+3=5 marks]

13. Explain the different Medium Access Control Techniques used in data communication. You can use appropriate examples for answer justification. [5 marks]

14. Explain the difference between Pure ALOHA and Slotted ALOHA with examples. [5 marks]

### Course Outcomes

- CO1. To understand signal flow in physical layer
- CO2. To understand the behavior of data link layer
- CO3. To apply the knowledge in the data communication systems

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	2, 5, 7, 13	8	65
CO2	1, 3, 4, 10, 11, 12	14	65
CO3	6, 8, 9, 14	8	65

**SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA**

School of Electronics & Communication Engineering

B. Tech. (ECE) 5<sup>th</sup> Semester Major Examination (Odd) 2019-20

**Entry No:** 17 BEC 033

**Date:** 11<sup>th</sup> December 2019

**Total Number of Pages:** [02]

**Total Number of Questions:** [10]

**Course Title:** Communication & Data Networks

**Course Code:** ECL 3100

**Time Allowed: 3.0 Hours**

**Max Marks: [50]**

Instructions / NOTE

- i. Attempt All Questions.
- ii. Assume an appropriate data / information, wherever necessary / missing.

Q1.	Describe the OSI seven layer model. Name each of the layers in the model and draw a diagram that shows the ordering of these layers. Explain the areas of function that each layer is responsible for. Contrast the OSI model, you have just described, with the TCP IP reference model.	[05]	CO1
Q2.	What is the cause of collisions in the network? How it can be avoided? Also explain the term Exponential Back-off.	[05]	CO2
Q3.	Describe the Bridged Ethernet and Switched Ethernet techniques using duplex mode of operation.	[05]	CO3
Q4.	Explain the Ethernet Frame format.	[05]	CO3
Q5.	What is ARP and why it is used? Also explain RARP.	[05]	CO2
Q6.	The digital signal is to be designed to permit 160 kbps for a bandwidth of 20 KHz. Determine (a) number of levels (b) S/N ratio.	[05]	CO1
Q7.	One of the Ethernet standards is called 10Base5. It uses a bus topology and the data rate is 10 Mbps. The speed of propagation in a 10Base5 cable is 2/3 of the speed of light. a) The maximum length of a 10Base5 cable is 500 meters. How long does it take for a bit to travel from the beginning to the end of the network? Ignore any propagation delay in the equipment.	[05]	CO3

	b) Using the above data, find the maximum time it takes for a sender to detect a collision. The worst case occurs when data are sent from one end of the cable and the collision happens at the other end. Remember that the signal needs to make a roundtrip.		
Q8.	A group of N stations share 100 Kbps slotted ALOHA channel. Each station output a 500 bits frame on an average of 5000 ms even if previous one has not been sent. What is the required value of N? (Hint: Calculate the throughput (in bps) of one station and throughput (in kbps) of slotted ALOHA. Efficiency of Slotted ALOHA is 36.8%).	[05]	CO 4
Q9.	<p>You have 8000 hosts in a network.</p> <p>a) Which IPv4 Class will you implement for the above network?</p> <p>b) In order to avoid host address space loss, implement the above network using CIDR (sub-net/super-net or both). (Take any value of IP address from the Class selected in (a)).</p>	[05]	CO 4
Q10.	Divide a network of Address 203.110.0.0/19 into five (5) sub-networks. One sub-network may have 2000 hosts and the rest other sub-networks may have 250 hosts each. Find out the <u>sub-network address</u> of each sub-network?	[05]	CO 5

### Course Outcomes

- CO1. To understand signal flow on physical layer.
- CO2. Able to understand behavior network layer.
- CO3. Able to understand behavior Data-link layer.
- CO4. Able to understand behavior Transport layer.
- CO5. To apply knowledge in the data communication systems.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1, 6	10	65
CO2	2, 5	10	65
CO3	3, 4, 7	15	65
CO4	8, 9	10	65
CO5	10	05	65