**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**Fourth Semester B.E. (CSE) (Credit System) Degree Examinations****Make up / Supplementary Examinations – July 2015****13CS405 – DATA COMMUNICATIONS**

Max. Marks: 100

Duration: 3 Hours

**Note: Answer Five full questions choosing One full question from each Unit.****Unit – I**

- |       |   |    |
|-------|---|----|
| 1. a) | What is Data communication? Explain components of Data Communication. | 08 |
| b)    | Define Protocol. Briefly explain TCP/IP Protocol suite.               | 10 |
| c)    | What is segmentation and reassembly?                                  | 02 |
| 2. a) | What is addressing? Discuss the different addressing scheme.          | 08 |
| b)    | Discuss the criteria of networks in details.                          | 08 |
| c)    | Explain briefly Transport and Session layer functionalities           | 04 |

**Unit – II**

- |       |   |    |
|-------|---|----|
| 3. a) | Name and Explain different types of Transmission Impairments  | 06 |
| b)    | State Shannon's and Nyquist's theorem for noise and noiseless channel. Calculate the bit rate for A noiseless channel with a bandwidth of 3000 Hz transmitting a signal with 2 signal levels. | 06 |
| c)    | Name and explain any 4 different performance parameters of network  | 08 |
| 4. a) | State classification of Line coding schemes and explain any 3 in detail.  | 12 |
| b)    | Name and explain two different types of scrambling techniques in detail   | 08 |

**Unit – III**

- |       |   |    |
|-------|---|----|
| 5. a) | Explain with neat diagram the components of PCM Analog to digital conversion technique.   | 10 |
| b)    | What is modulation? Name different modulation techniques. Explain any one modulation.   | 05 |
| c)    | Classify Digital to analog conversion techniques. How do you modulate the signals using QPSK                                      | 05 |
| 6. a) | How Cyclic Redundancy Check can be used in encoding and decoding process used for error detection scheme explain with an example. | 10 |
| b)    | Discuss hamming code with an example.   | 10 |

**Unit – IV**

- |       |   |    |
|-------|---|----|
| 7. a) | Explain setup request in Virtual circuit network.   | 05 |
| b)    | Assume that a voice channel occupies a bandwidth of 4 kHz. We need to combine three voice channels into a link with a bandwidth of 12 kHz, from 20 to 32 kHz. Show the configuration, using the frequency domain. Assume there are no guard bands | 05 |
| c)    | Frequency Hopping Spread Spectrum (FHSS)  | 05 |
| d)    | Design a three-stage, $200 \times 200$ switch ( $N = 200$ ) with $k = 4$ and $n = 20$ .   | 05 |
| 8. a) | Differentiate between Circuit switched network and packet-switched network  | 03 |
| b)    | Categorize and explain different types of multiplexing schemes.   | 10 |
| c)    | What is delay? Explain delay in virtual circuit network.  | 07 |

**Unit – V**

- |        |   |    |
|--------|---|----|
| 9. a)  | Categorize different types of protocols. Discuss the protocols used under noisy channel | 10 |
| b)     | Explain the concept of Byte stuffing and bit stuffing in Framing                        | 05 |
| c)     | What is piggybacking? Explain.  | 05 |
| 10. a) | Explain Pure ALOHA  | 10 |
| b)     | Explain 3 different protocols used in Channelization                                    | 10 |

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**Fourth Semester B.E. (CSE) (Credit System) Degree Examinations**

April - May 2015

**13CS405 – DATA COMMUNICATIONS**

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.****Unit – I**

- a) What is Data Communication System? Explain Components of Data Communication System. 6
- b) Name and explain criterias necessary for an effective and efficient network. 6
- c) What is topology? Explain Various Categories of topology. 8
- a) Define protocol. Explain key elements of a protocol. 6
- b) Explain interaction between layers in the OSI model with neat diagram. 10
- c) Explain various responsibilities of Transport layer. 4

**Unit – II**

- a) Distinguish between low pass channel and band pass channel. 6
- b) Explain basic terms to improve network performance. 6
- c) Explain various Data transmission modes. 8
- a) Compare and contrast between Pulse Code Modulation and Delta Modulation. 6
- b) Explain following line coding schemes with examples.
  - (i) Polar line coding (ii) Multilevel line coding. 8
- c) List three different techniques in serial transmission and explain ~~the~~ differences. 6

**Unit – III**

- a) What is Phase shift keying (PSK)? Explain types of PSK. 6
- b) Explain the concept of constellation diagram. 8
- c) Explain following modulation techniques.
  - (i) Frequency modulation (FM) 6
  - (ii) Phase modulation (PM) 6
- a) What is Fiber optic Cable? Explain two different propagation modes of Fiber optic cable. 6
- b) Explain The process of Error detection in Block coding. 4
- c) What is internet Checksum? If a sender needs to send four data items Ox3456, OxABCC, Ox~~Q~~2BC and OxEEEE answer the following.
  - i) Find the checksum at sender site. 10
  - ii) Find the checksum at receiver's site if there is no error. 10

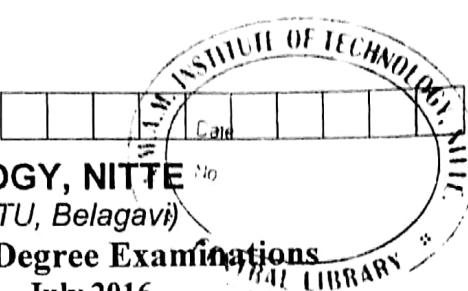
**Unit – IV**

- a) Explain virtual Circuit Networks with three phases. 8
- b) Explain the structure of packet switches. 6
- c) Draw and explain Banyan Switch. 6
- a) Explain Frequency Division Multiplexing (FDM) with neat diagram. 6
- b) What is TDM? Explain Synchronous TDM with neat diagram. 8
- c) Define speed Spectrum. Explain FHSS process. 6

**Unit – V**

- a) Explain Go-BACK-N ARQ & selective Repeat ARQ. List the differences between them. 10
- b) Explain the different frame types in HDLL. 6
- c) Write a short note on piggy backing. 4
- a) With a flow diagram explain the working of CSMA/CD. 10
- b) Explain the following channelization techniques.
  - i) TDMA ii) CDMA 10

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## NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

### Fourth Semester B.E. (CSE) (Credit System) Degree Examinations

Make up / Supplementary Examinations – July 2016

#### 14CS405 – DATA COMMUNICATIONS

Duration: 3 Hours

Max. Marks: 100

Note: Answer **Five full** questions choosing **One full** question from each Unit.

	Unit – I	Marks	BT*
1. a)	Categorize the four basic topologies in terms of line configuration.	10	L*3
b)	Explain interaction between layers in the OSI model with neat diagram.	10	L2
2. a)	What are the two possible connections in communication between two devices in a network? Explain.	6	L2
b)	Why standards are essential in data communications? Define the types of standards. Also explain internet standards.	6	L2
c)	What are the specific responsibilities of presentation and application layers?	8	L2
	Unit – II		
3. a)	Discuss the process of delta modulation.	12	L2
b)	Discuss the working of low pass channel with wide and limited bandwidth.	8	L2
4. a)	Explain the steps in PCM.	10	L2
b)	Explain the Parallel data transmission.	5	L2
c)	Given a channel with an intended capacity of 20 Mbps. The bandwidth of the channel is 3 MHz. What signal-to-noise ratio is required in order to achieve this capacity?	5	L5
	Unit – III		
5. a)	Give classification details of different modulating mechanism used to convert digital to analog conversion process. Convert digital data 10110 into analog by using different modulation mechanism.	10	L4
b)	Explain the process of error detection in Block coding scheme.	5	L2
c)	Write short note on Constellation diagram.	5	L2
5. a)	What are the different classes of converting Low pass signal to Band pass signal? Explain each class in detail.	10	L4
b)	Explain the process of Simple parity check with neat diagram.	5	L2
c)	List different categories of Wireless transmission modes and its uses.	5	L4
	Unit – IV		
7. a)	Five channels, each with a 100 kHz bandwidth are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 10khz between the channels to prevent interface?	4	L3
b)	Explain statistical TDM with an example.	7	L2
c)	How are the packets routed to their destinations if there are no setup and teardown phases, explain.	4	L4
d)	Explain the delay in datagram network.	5	L2
8. a)	Design three-stage, 200*200 switch (N=200) with k=4 and n=20.	5	L6
b)	Specify the characteristics of a virtual-circuit network.	5	L1
c)	What is multiplexing? Explain.	5	L2
d)	Explain frequency-division multiplexing.	5	L2
	Unit – V		
9. a)	Differentiate pure aloha and slotted aloha. Discuss the working of slotted aloha with diagram.	10	L2
b)	Demonstrate with diagram, the working of go-back-N ARQ protocol over a noiseless channel.	10	L4
10. a)	Explain fixed and variable size framing methods with the aid of diagrams.	10	L2
b)	Justify with the design diagram and flow diagram the suitability of stop and wait ARQ protocol for noiseless channel.	10	L6

BT\* Bloom's Taxonomy, L\* Level

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belgaum)

**Fourth Semester B.E. (CSE) (Credit System) Degree Examinations**

April - May 2016

**14CS405 – DATA COMMUNICATIONS**

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.**

**Unit – I**

- |    |  |         |         |
|----|--|---------|---------|
| 1. | a) Give the difference between half-duplex and full-duplex transmission modes.       | Marks 6 | BT* L*2 |
| b) | What are the responsibilities of Physical Layer? Explain.                            | 6       | L2      |
| c) | Discuss Mesh and Star topology in computer networks.                                 | 8       | L2      |
| 2. | a) Discuss the physical addresses, logical addresses and port addresses in internet. | 6       | L2      |
| b) | What is data communication? Explain the components involved in it.                   | 6       | L2      |
| c) | With neat diagram explain the layered architecture of OSI Model.                     | 8       | L2      |

**Unit – II**

- |    |   |    |    |
|----|---|----|----|
| 3. | a) Discuss the transmission of digital signals over a channel without changing it to analog signals.                  | 8  | L2 |
| b) | Discuss line coding and distinguish between signal element and data element.  | 8  | L2 |
| c) | Determine the channel capacity for a teleprinter channel with a 300 Hz bandwidth and a signal-to-noise ratio of 3 DB? | 4  | L5 |
| 4. | a) Explain transmission mode in detail.   | 11 | L2 |
| b) | Design NRZ-I, Differential Manchester, MLT-3 for 01110111101111.  | 9  | L6 |

**Unit – III**

- |    |  |    |    |
|----|--|----|----|
| 5. | a) Discuss hamming code with an example.   | 10 | L3 |
| b) | What is modulation? Name different modulation techniques. Explain any one modulation.  | 5  | L2 |
| c) | Classify Digital to analog conversion techniques. How do you modulate the signals using QPSK.  | 5  | L4 |
| 6. | a) How Cyclic Redundancy Check can be used in encoding and decoding process used for error detection scheme explain with an example. | 10 | L4 |
| b) | Write short note on:<br>i) Unguided Transmission media    ii) Constellation diagram  | 10 | L1 |

**Unit – IV**

- |    |   |    |    |
|----|---|----|----|
| 7. | a) Discuss the acknowledgement phase of virtual-circuit network.  | 7  | L2 |
| b) | With a neat diagram, explain crossbar switch.   | 5  | L2 |
| c) | Discuss the different phases, a source and destination need to go through in a virtual-circuit network. | 8  | L4 |
| 8. | a) Explain frequency hopping spread spectrum with an example.   | 10 | L4 |
| b) | What is pulse stuffing? Explain.  | 5  | L2 |
| c) | Explain wavelength-division multiplexing and de-multiplexing.   | 5  | L2 |

**Unit – V**

- |     |   |    |    |
|-----|---|----|----|
| 9.  | a) Demonstrate with the design how the Go-Back-N Automatic Repeat Request controls flow in noiseless channel?   | 5  | L6 |
| b)  | Give the algorithm for sender and receiver in simplest protocol controls flow in noiseless channel.             | 5  | L2 |
| c)  | Describe the frame format of PPP giving details of each field.  | 10 | L2 |
| 10. | a) List out any five services provided by PPP.  | 5  | L1 |
| b)  | Justify with diagram that the window size selection in the Selective Repeat ARQ gives the optimum flow control. | 5  | L5 |
| c)  | Explain HDLC transmission modes.  | 10 | L2 |

BT\* Bloom's Taxonomy, L\* Level

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**CENTRAL LIBRARY**

**Fourth Semester B.E. (CSE/ISE) (Credit System) Degree Examinations**

**Make up / Supplementary Examinations – July 2017**

**15CS404 / 15IS404 / 14CS405 / IS304 – DATA COMMUNICATIONS**

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.**

**Unit – I**

- |  | <b>Marks</b> | <b>BT*</b> |
|--|--------------|------------|
| 1. a) List the functionalities of Transport layer.                         | 5            | L*2        |
| b) Discuss unified layering concept.                                       | 08           | L3         |
| c) Explain FTP protocol.   | 07           | L2         |
| 2. a) List the various network services. Discuss any two network services. | 08           | L4         |
| b) Compare connection oriented v/s connection less.                        | 07           | L3         |
| c) List the functionalities of Data link layer.                            | 05           | L1         |

**Unit – II**

- |   |    |    |
|---|----|----|
| 3. a) What is the relationship between period and frequency? Discuss.         | 05 | L4 |
| b) What is transmission impairment? List and Discuss various impairments.     | 10 | L3 |
| c) What does Nyquist theorem have to do with communications?                  | 05 | L5 |
| 4. a) What is network performance? List and discuss various QoS measurements. | 10 | L4 |
| b) When do you prefer digital transmission? Explain.                          | 05 | L4 |
| c) Analyze the effect of DC component in polar NRZ.                           | 05 | L6 |

**Unit – III**

- |   |    |    |
|---|----|----|
| 5. a) Define digital-to-digital conversion? Explain QPSK.                                   | 10 | L3 |
| b) What is the need of analog-to-analog conversion? Discuss.                                | 05 | L4 |
| c) What is error in transmission? List and explain types of errors.                         | 05 | L2 |
| 6. a) With the neat sketch discuss the general design of encoder and decoder of a CRC code. | 10 | L4 |
| b) Determine the codeword for 1001 using generator 1011.(use polynomial division only)      | 05 | L3 |
| c) Find out the checksum for data "forouzan".   | 05 | L4 |

**Unit – IV**

- |   |    |    |
|---|----|----|
| 7. a) Discuss TDM.  | 05 | L3 |
| b) What is framing? Name and discuss the different types of frames. | 10 | L2 |
| c) Explain piggybacking.  | 05 | L2 |

**P.T.O.**

8. a) With a neat diagram explain Stop-and-wait ARQ protocol for noisy channel  
b) Define pulse stuffing. Discuss the process of pulse stuffing.  
C) Explain frequency division multiplexing.

### Unit – V

9. a) Explain the vulnerable time of CSMA.  
b) Discuss collision and abortion in CSMA/CD.  
c) Discuss polling.

10. Write short note on the following:

- a) Fibre-optic cable. 05 L2
- b) Token-passing. 05 L2
- c) CDMA. 05 L2
- d) CSMA. 05 L2

BT\* Bloom's Taxonomy, L\* Level

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07 L6

07 L6

06 L2

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## NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

## Fourth Semester B.E. (CSE/ISE) (Credit System) Degree Examinations

April - May 2017

## 15CS404 / 15IS404 – DATA COMMUNICATIONS

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.****Unit – I****Marks**

1. a) What is TCP/IP? Explain TCP/IP network architecture. 8  
b) Explain the functionality of following networks with neat diagram 12  
i) Telegraph Networks and Message Switching  
ii) Telephone Networks and Circuit Switching  
iii) Computer Networks and Packet Switching
2. a) What is PDU? Explain how to encapsulate PDUs in TCP/IP networks. 6  
b) Briefly explain the features of Telnet and FTP. 6  
c) How many layers were present OSI model? Explain the responsibilities of each layer. 8

**Unit – II**

3. a) What are the basic properties of digital transmission systems? Explain. 6  
b) Define Shanon's Channel Capacity. A modem operating over a telephone line of bandwidth 3400 Hz and assume that SNR of telephone line is 40 dB. Calculate its Channel Capacity. 6  
c) Name any four line coding methods used in digital transmission and draw a digital signal that produced by line codes of binary sequence 101011100. 8
4. a) Explain the properties of two types of media used in digital transmission systems. 6  
b) What is Nyquist Signaling rate? Explain. 6  
c) Explain the two types of transmission modes. 8

**Unit – III**

5. a) What is CRC? Explain CRC technique with the help of polynomial codes. 10  
b) Write note on i) ASK ii) FSK iii) PSK iv) QASK. 10
6. a) What is SONET? Explain SONET Multiplexing. 6  
b) Distinguish between space division switches and time division switches. 6  
c) Explain linear codes and its performance with example. 8

**Unit – IV**

7. a) Explain Stop and Wait ARQ with system state information. 10  
b) Write a note on i) FDM ii) TDM 10
8. a) What is statistical multiplexing? Explain. 8  
b) Explain Go-Back-N ARQ protocol with neat diagrams. 12

**Unit – V**

9. a) What is polling? Explain the examples of polling. 10  
b) Explain CSMA and CSMA-CD. 10
10. a) Explain various channelization techniques used in data communication. 10  
b) Describe token passing rings with example. 10

**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**III Sem B.E. (CSE) Mid Semester Examinations - I, September 2017****16CS306 – DATA COMMUNICATIONS**

Duration: 1 Hour

Max. Marks: 20

**Note: Answer any One full question from each Unit.****Unit – I**

- |       |  |    |     |
|-------|--|----|-----|
| 1. a) | Distinguish between Circuit Switching, Message Switching and Packet Switching. | 06 | L*2 |
| b)    | List the steps involved in retrieving a document from Web.                     | 04 | L1  |
| 2. a) | Explain the different layers of TCP/IP.  | 06 | L2  |
| b)    | Discuss briefly the following:<br>i. Bus topology<br>ii. Star topology         | 04 | L2  |

**Unit – II**

- |       |  |    |    |
|-------|--|----|----|
| 3. a) | Explain the different characteristics of line coding.  | 06 | L2 |
| b)    | Calculate the channel capacity for the following values:<br>Bandwidth= 200kHz SNR <sub>dB</sub> =6 | 04 | L3 |
| 4. a) | Discuss the different types of transmission impairment.  | 06 | L2 |
| b)    | Apply the NRZ-L, NRZ-I coding scheme for the following bit sequence:<br><b>101100010011</b>        | 04 | L3 |

BT\* Bloom's Taxonomy, L\* Level

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**III Sem B.E. (CSE) Mid Semester Examinations - II, October 2017**

**16CS306 – DATA COMMUNICATIONS**

Duration: 1 Hour

Max. Marks: 20

**Note: Answer any One full question from each Unit.**

**Unit – I**

- |   |          |         |
|---|----------|---------|
| 1. a) With suitable diagrams, Explain Quadrature Phase Shift Keying (QPSK).       | Marks 07 | BT* L*2 |
| b) Explain Wavelength Division Multiplexing.                                      | 03       | L2      |
| 2. a) Discuss the working of Synchronous TDM along with the data rate management. | 07       | L2      |
| b) Explain Binary Frequency Shift Keying.   | 03       | L2      |

**Unit – II**

- |   |    |    |
|---|----|----|
| 3. a) Explain Stop & Wait Protocol.               | 06 | L2 |
| b) Compare & Contrast the various service models. | 04 | L3 |
| 4. a) Explain Go Back N ARQ Protocol.             | 06 | L2 |
| b) List & Explain various adaptation functions.   | 04 | L2 |

BT\* Bloom's Taxonomy, L\* Level

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USN 

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**Third Semester B.E. (CSE) (Credit System) Degree Examinations**

November – December 2017

Duration: 3 Hours

**16CS306 – DATA COMMUNICATIONS**

Note: Answer Five full questions choosing One full question from each Unit.

Max. Marks: 100

- | a)                | Discuss the fundamental characteristics on which the effectiveness of data communication depends?   | Marks | BT* |
|-------------------|---|-------|-----|
| a)                | Discuss the responsibilities of transport layer in the network model.   | 10    | L*6 |
| b)                | Explain the responsibilities of data link layer.  | 10    | L2  |
| a)                | Explain OSI reference model.  | 10    | L6  |
| b)                |   | 10    | L2  |
| <b>Unit – I</b>   |   |       |     |
| 5.                | a) What are the basic properties of digital transmission systems? Explain with suitable example.<br>b) Draw line code of sequence 010011 using NRZ NRZ-L NRZ-I Manchester, RZ and differential Manchester schemes.  | 10    | L2  |
| a)                | List out the properties of media used in digital transmission systems. Explain any two.   | 10    | L3  |
| b)                | What is Nyquist signaling rate? Explain with example.   | 7     | L2  |
| c)                | Write a short note on<br>i) Hamming code ii) CRC  | 6     | L2  |
|                   |   | 7     | L2  |
| <b>Unit – II</b>  |   |       |     |
| 6.                | a) With suitable example discuss following<br>i) ASK ii) FSK iii) PSK iv) QASK<br>b) i) An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate.<br>ii) An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need?<br>c) Differentiate Amplitude modulation and Frequency modulation. | 10    | L6  |
| a)                |   | 4     | L3  |
| b)                |   | 6     | L2  |
| c)                |   | 6     | L2  |
|                   |   | 6     | L2  |
| <b>Unit – III</b> |   |       |     |
| 7.                | a) What is SONET? Explain SONET multiplexing.<br>b) Explain Time Division Multiplexing.<br>c) Explain SONET Frame structures.   | 8     | L2  |
| a)                |   | 6     | L2  |
| b)                |   | 6     | L2  |
| c)                |   | 6     | L2  |
| <b>Unit – IV</b>  |   |       |     |
| 8.                | a) Differentiate between noisy channels and noiseless channel. Explain stop and wait protocols.<br>b) Explain selective repeat ARQ.   | 10    | L2  |
| a)                |   | 10    | L2  |
| b)                |   | 10    | L2  |
|                   |   | 10    | L2  |
| <b>Unit – V</b>   |   |       |     |
| 9.                | a) With a neat diagram explain IEEE 802.3 frame structure.<br>b) With a neat diagram explain logical link control sublayer and MAC sublayer.  | 10    | L2  |
| a)                |   | 10    | L2  |
| b)                |   | 10    | L2  |
| 0.                | a) Explain the frame structure and addressing of IEEE 802.11 standard protocol.<br>b) Write short notes on fast Ethernet and Gigabit Ethernet.  | 10    | L2  |
| a)                |   | 10    | L2  |
| b)                |   | 10    | L2  |

BT\* Bloom's Taxonomy, L\* Level

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

(An Autonomous Institution affiliated to VTU, Belagavi)

**Third Semester B.E. (CSE) (Credit System) Degree Examinations****Make up Examinations - January 2018****16CS306 – DATA COMMUNICATIONS**

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.****Unit – I**

- |   | Marks | BT* |
|---|-------|-----|
| a) Discuss the essential functions of network operation.                    | 8     | L*6 |
| b) Explain the OSI reference model with the aid of diagram.                 | 12    | L2  |
| a) How the layers work together in TCP/IP model? Explain.                   | 10    | L2  |
| b) What is Communication Networks? Explain the various networks & services. | 10    | L2  |

**Unit – II**

- |  |    |    |
|--|----|----|
| a) What are the three parameters of sine wave? Discuss.  | 6  | L6 |
| b) What is Shanon's Channel Capacity? A modem operating over a telephone line of bandwidth 3400 Hz and assume that SNR of telephone line is 40 dB. Calculate its Channel Capacity. | 6  | L3 |
| c) List and discuss the characteristics of line coding schemes.  | 8  | L6 |
| a) Mention the different line coding methods used in digital transmission and draw a digital signal that produced by line codes of binary sequence 101011100                       | 10 | L3 |
| b) What are CRCs? Explain CRC technique with the help of polynomial codes.   | 10 | L5 |

**Unit – III**

- |  |    |    |
|--|----|----|
| a) Describe the Amplitude Shift Keying and Frequency Shift Keying. | 10 | L5 |
| b) Explain SONET Multiplexing and Wavelength Multiplexing.         | 10 | L2 |
| a) Describe the Phase Shift Keying in detail.                      | 10 | L2 |
| b) What is Multiplexing? Compare the FDM and TDM.                  | 10 | L4 |

**Unit – IV**

- |   |    |    |
|---|----|----|
| a) Explain Stop and Wait ARQ with system state information.                 | 10 | L2 |
| b) Discuss the Peer-to Peer protocol across a single hop with neat diagram. | 10 | L6 |
| a) Describe Connection Oriented Services and Connection less services.      | 8  | L4 |
| b) Explain Go-Back-N ARQ protocol with neat diagrams.                       | 12 | L2 |

**Unit – V**

- |   |    |    |
|---|----|----|
| a) Explain Ethernet protocol and its performance aspects. | 10 | L4 |
| b) Describe the IEEE 802.3 frame structure.               | 10 | L2 |

Write a note on the following

- |                     |   |    |
|---------------------|---|----|
| a) Gigabit Ethernet | 6 | L2 |
| b) Fast Ethernet    | 8 |    |
| c) Physical Layer   | 6 |    |

**NMAM INSTITUTE OF TECHNOLOGY, NITTE**  
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**Third Semester B.E. (CSE) (Credit System) Degree Examinations**  
**Supplementary Examinations – July 2018**

16CS306 / 15CS404 / 14CS405 – DATA COMMUNICATIONS

Duration: 3 Hours

Max. Marks: 100

**Note: Answer Five full questions choosing One full question from each Unit.**

**Unit – I**

- |   | Marks | BT* |
|---|-------|-----|
| 1. a) Suppose all laptops in a large city are to communicate using radio transmissions from a high antenna tower. Is the data link layer or network layer more appropriate for this situation?  | 05    | L*4 |
| b) What elements and functions are essential in the architecture of the telephone network?  | 10    | L1  |
| c) Suppose that the TCP entity receives a 1.5 megabyte file from the application layer and that the IP layer is willing to carry blocks of maximum size 1500 bytes. Calculate the amount of overhead incurred from segmenting the file into packet-sized units.   | 05    | L3  |
| 2. a) Suppose an application layer entity wants to send an L-byte message to its peer process, using an existing TCP connection. The TCP segment consists of the message plus 20 bytes of header. The segment is encapsulated into an IP packet that has an additional 20 bytes of header. The IP packet in turn goes inside an Ethernet frame that has 18 bytes of header and trailer. What percentage of the transmitted bits in the physical layer correspond to message information, if L = 100 bytes, 500 bytes, 1000 bytes? | 05    | L3  |
| b) Compare connection oriented services v/s connectionless services.  | 07    | L5  |
| c) Specify three features that the datalink layer and transport layer have in common. Specify two features in which they differ.  | 08    | L5  |

**Unit – II**

- |  |    |    |
|--|----|----|
| 3. a) Define channel capacity of a transmission systems. And discuss the shannon theory.   | 05 | L6 |
| b) A scanner has resolution of 600*600 pixels/square inch. How many bits are produced by an 8-inch * 10-inch image of scanning uses 8 bits/pixel? 24 bits/pixel? | 05 | L3 |
| c) Discuss the various line coding characteristics.  | 10 | L6 |
| 4. a) Design hardware for CRC-8. Determine codeword for 1001   | 08 | L6 |
| b) Draw the spectrum for the following data using unipolar, polar and bipolar schemes. 101011100   | 08 | L2 |
| c) Explain Internet checksum.  | 04 | L2 |

**Unit – III**

- |   |    |    |
|---|----|----|
| 5. a) Define digital to analog conversion. Discuss the aspects of digital to analog conversion.   | 07 | L6 |
| b) A television transmission channel occupies a bandwidth of 6 MHz.<br>a) how many two way 30 Khz analog voice channels can be frequency division multiplexed in a single television channel?<br>b) how many two way 200 Khz GSM channels can be frequency division multiplexed in a single television channel? | 05 | L3 |

c)	Explain QPSK.		
6.	a) A cable sheath has an inner diameter of 2.5 cm. a) estimate the number of wires that can be contained in the cable if the wire has a diameter of 5mm. b) estimate the diameter of the cable that holds 2700 wire pairs. b) Explain SONET STS-1 frame structure. c) Discuss statistical TDM.	08 06 07 07	L2 L3 L2 L6
	<b>Unit – IV</b>		
7.	a) Explain the difference between connection oriented acknowledged service and connectionless acknowledged service. How do the protocols that provide these services differ? b) List and discuss the services offered by a given layer.	12 08	L4 L6
8.	a) With a neat timing diagram discuss the data transmission using Stop and wait ARQ. b) Explain selective repeat ARQ.	10 10	L6 L2
	<b>Unit – V</b>		
9.	a) With a neat diagram explain LAN Structure. b) Draw the 802.3 MAC frame. Explain all the fields. c) Compare IEEE 802 LAN standards v/s OSI reference model	06 08 06	L2 L2 L4
10	Write a short note on the following: a) Basic CSMA-CA operation. b) Point coordination function. c) Physical layers d) LLC Sublayer.	20	L2

BT\* Bloom's Taxonomy, L\* Level

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**  
 (An Autonomous Institution affiliated to VTU, Belagavi)  
**IV Sem B.E. (Credit System) Mid Semester Examinations - I, February 2017**  
**15CS404 – DATA COMMUNICATIONS**

Duration: 1 Hour

Max. Marks: 20

Note: Answer any One full question from each Unit.

**Unit – I**

- a) Define data communication.
- a) Compare message switching & circuit switching with an example.
- b) Describe the functionality of data-link layer & transport layer of OSI model.
- 2. a) Determine the appropriate layers of OSI for the following:
  - i. Format and code conversion services
  - ii. Error correction and re-transmission
  - iii. Ensures reliable transmission of data
  - iv. Log-in and log-out procedures
  - v. Responsibility for carrying frames between adjacent nodes
- b) Describe FTP protocols in detail.

Marks BT\*

5 L\*4  
5 L2

5 L5  
5 L2

**Unit – II**

- 3. a) Discuss different characteristics of Line Coding.
- b) Explain different types of transmission impairment.
- 4. a) Explain the baseband transmission of digital signals.
- b) Calculate the theoretical capacity of channel in following cases:
  - a. Bandwidth = 20kHz SNR<sub>dB</sub> = 40
  - b. Bandwidth = 1MHz SNR<sub>dB</sub> = 20

6 L2  
4 L2

6 L2

4 L4

\* Bloom's Taxonomy, L\* Level

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**NMAM INSTITUTE OF TECHNOLOGY, NITTE**

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**IV Sem B.E. (CSE/ISE) Mid Semester Examinations - II, March 2017****15CS404/15IS404 – DATA COMMUNICATION**

Max. Marks: 20

Duration: 1 Hour

**Note: Answer any One full question from each Unit.****Unit – I****Marks BT\***

1. a) Define cyclic codes.  
Let  $g(x) = x^3 + x + 1$ . Consider the information sequence 1001.  
i) Find the codeword corresponding to the information sequence.  
ii) Suppose the codeword has transmission error in the second bit. What does the receiver obtain when it does error checking?
- b) What is constellation diagram? Explain the role of constellation diagram in analog transmission with an example.
- c) List the characteristics of good polynomial generator.
2. a) Calculate the Internet Checksum for the word 'DataWord' at sender & receiver site. Hint: ASCII value of A = 41 & a = 61.  
b) Draw the waveforms for BASK, BPSK and BFSK by taking an example  
**0011011010.**  
c) Define linear block codes. With neat diagram explain the structure of encoder and decoder for simple parity-check code.

**Unit – II**

4 L\*4

3 L2

3 L1

4 L4

3 L3

3 L2

5 L2

5 L2

5 L2

5 L2

5 L2

5 L2

3. a) Explain the data rate management in TDM.  
b) What is multiplexing? Give the differences between FDM and WDM.

4. a) Explain analog hierarchy by considering an example of telephone company.  
b) Explain two different schemes of TDM.

BT\* Bloom's Taxonomy, L\* Level

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# NMAM INSTITUTE OF TECHNOLOGY, NITTE

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## Fourth Semester B.E. (CSE/ISE) (Credit System) Degree Examinations

April - May 2017

### 15CS404 / 15IS404 – DATA COMMUNICATIONS

Duration: 3 Hours

Note: Answer Five full questions choosing One full question from each Unit.

Max. Marks: 100

#### Unit – I

- |  |            |
|--|------------|
| a) What is TCP/IP? Explain TCP/IP network architecture.                                | Marks<br>8 |
| b) Explain the functionality of following networks with neat diagram                   |            |
| i) Telegraph Networks and Message Switching  |            |
| ii) Telephone Networks and Circuit Switching   |            |
| iii) Computer Networks and Packet Switching  |            |
| a) What is PDU? Explain how to encapsulate PDUs in TCP/IP networks.                    | 12         |
| b) Briefly explain the features of Telnet and FTP.                                     | 6          |
| c) How many layers were present OSI model? Explain the responsibilities of each layer. | 6          |
|  | 8          |

#### Unit – II

- |   |   |
|---|---|
| a) What are the basic properties of digital transmission systems? Explain.  | 6 |
| b) Define Shanon's Channel Capacity. A modem operating over a telephone line of bandwidth 3400 Hz and assume that SNR of telephone line is 40 dB. Calculate its Channel Capacity. |   |
| c) Name any four line coding methods used in digital transmission and draw a digital signal that produced by line codes of binary sequence 101011100.                             | 6 |
|   | 8 |
| a) Explain the properties of two types of media used in digital transmission systems.   | 6 |
| b) What is Nyquist Signaling rate? Explain.   | 6 |
| c) Explain the two types of transmission modes.   | 8 |

#### Unit – III

- |  |    |
|--|----|
| a) What is CRC? Explain CRC technique with the help of polynomial codes.           | 10 |
| b) Write note on i) ASK ii) FSK iii) PSK iv) QASK.                                 | 10 |
| a) What is SONET? Explain SONET Multiplexing.                                      | 6  |
| b) Distinguish between space division multiplexing and time division multiplexing. | 6  |
| c) Explain linear codes and its performance with example.                          | 8  |

#### Unit – IV

- |   |    |
|---|----|
| a) Explain Stop and Wait ARQ with system state information. | 10 |
| b) Write a note on i) FDM ii) TDM                           | 10 |
| a) What is statistical multiplexing? Explain.               | 8  |
| b) Explain Go-Back-N ARQ protocol with neat diagrams.       | 12 |

#### Unit – V

- |  |    |
|--|----|
| a) What is polling? Explain the examples of polling.                     | 10 |
| b) Explain CSMA and CSMA-CD.   | 10 |
| a) Explain various channelization techniques used in data communication. | 10 |
| b) Describe token passing rings with example.                            | 10 |