DATA COMMUNICATION CT QUESTIONS: -

Combined by Arkajyoti Naskar with 69 others 😉

CT-1: -

SET 1 - *Baseline Wandering*, OSI model physical level working, unguided transmission, Fourier transform, *Attenuation* (Power calculation), Bit rate and baud rate related problems, *bandwidth requirement of PSK*

SET 2 - X

SET 3 - *baseline wandering*, *Manchester* and *disadvantage of optical fibre*, 4 parameters that determined efficiency of a dc system, *FSK implementation, measurement of ASK, QAM and PSK*, *attenuation* of signals.

SET 4 - Basic Implementation of PSK Concerns of Physical and data link layer. *Bandwidth of FSK*, Fourier Fourier series of x^2, *Topology and types of basic topology*, Why Ring topology fails if one node collapses

SET 5 - Types of addresses in data comm and in which layers of OSI it is implemented, *Compare and contrast between RZ and AMI*, Self-synchronising signal.

SET 6 - 4 features of efficient data communication, *NRZ-L vs NRZ-I, advantages and disadvantages of optical fibre.*

SET 7 - Q1. Difference between logical, physical and port address. Explain their role in TCP/IP model. What half duplex and full duplex transmission model? Give one example of each. (6+4)

Q2. *What is baseline wandering? How does Manchester scheming overcome that?* The loss in a cable is usually defined in decibels per km (dB/km). If the signal at the beginning of a cable with −0.3 dB/km has a power of 5 mW, what is the power of the signal at 20 km? (2+4+4)

Q3. *Difference between baud rate and bit rate?* "Block code aid error synchronization"--Explain with a technique. For a sampled low-pass signal with bandwidth 400kHz and quantization level 512, calculate the digital bit rate of the signal. (2+5+3)

SET 8 - Half duplex and full duplex difference with example. Channel capacity for noise and noiseless mediums. Numerical - Point 1 to Point 2 have N

amplifiers, each amplifier has gain of M db. The let power is 100 times the input power. If n<= m, what is. The maximum value of n?

What is modulation rate? Contrast and compare PCM and DM. Question of propagation time and transmission time from the slide, bandwidth, bit rate and size of message given.

Suggest a line encoding scheme which solves issue of synchronisation. *How scrambling helps in removing DC components*?

Numerical - ratio of signal to data element given. Data rate given. What is average baud rate?

SET 9 - How physical layer handles data rate, line organisation, synchronisation of bits, transmission modes?

how scrambling solves DC components, NRZ-I and Manchester signal rate comparison, show that Fourier series of even function contains only DC and cosine terms, *advantage and disadvantage of optical fibre, what is RF, why is it used widely in communication,* why X rays and gamma rays are theoretically better but not used practically in communication

SET 10 - *what is topology? name the four types of topologies.* If there are n devices in each of topology find the min number of cables required to build this topology. *If one node is failed then the whole ring topology failed - explain.* Find the number of bits, when signal level is given (Q1)

Signal energy gain/loss related problem relative power of signal is given. Find Fourier expression of f(x)=x if f(2π+x) =f(x). Given sample rate of a signal is 4000, find the bit rate. (Q2)

QPSK, Analog signal related problem - amplitude of analog signal is -40v to +40v, uniform amplitude is 10v find SNR(Q3)

CT-2: -

SET 1- *What is ARQ?* How does it help in flow control? problem with Stop and wait approach and how to resolve? *Synchronous TDM explanation and numerical. What is Checksum and numerical.*

What do you mean by Redundancy in error detection and correction?

SET 2- 1. *For Optical data what multiplexing we use, explain, state difference between synchronous TDM and Statistical TDM*. (6+4)

2. *Explain how you will guarantee for correct of 4bit in all cases of block coding, CRC numerical* (5+5)

3. *Explain FHSS with diagram, 12 packets are sent by go back n ARQ, in every 3rd packet data was lost so tell how many total packet is needed to transfer all the data from A to B(4+6)*

SET 3- *Find Checksum* (given 4digit hex code) then change the 4th hex code now detect the error. *CRC*- generate the parity bits for a data word and change a bit and check the received codeword detect the error.

FHSS, DSSS, Define spread spectrum and its uses. Explain Stop and wait ARQ.

15 packets are to be sent by go and back N ARQ where the 4th packet is not transferred every time, find how many packets the sender sends, with diagram.

Explain Bandwidth utilization

SET 4- Difference between linear block coding and cyclic coding? *Compare redundancy in error detection and correction. Which error cannot be detected in checksum.* consider class roll no as a list of 4bit numbers show how checksum works. How long will it take to transmit 1 million bits, distance is 5000km and propagation speed is 2*10^8m/s and each packet contains 1000 bits in stop and wait ARQ. Explain design in Go-Back-N ARQ

SET 5- *Synchronous and Statistical TDM difference*. Given list of 5 4-bit numbers show how checksum works. Which error is undetectable by checksum.

How many bits you need for (i) detection of k bit error, (ii) correction of m bit error on block encoding. Criteria for good polynomial generator.

Describe design of go-back-N protocol. Problem related to go-back-N protocol. Implementation of a Go-Back-N ARQ given a number of packets to transfer

SET 6- *Redundancy, Checksum Calculation* and Verification, *Time Division Multiplexing* and related numerical problems, *bandwidth utilization techniques, stop-and-wait protocol*, numerical problem related to go-back-N protocol.

SET 7- *Explain Go Back N ARQ*. *11 data packets, if every 5th packet from A to B is lost, but no ACKs from B are lost, then how many frames are sent by A.*

Difference between synchronous and statistical TDM. Explain error detection using checksum technique using given set of numbers. If one of the numbers changes to something else, show how decoder will detect the error.

Explain FHSS. Generate codeword based on given message and generator polynomial. If left most bit is changed when transmitted then show how the detector will detect error.

SET 8- 1*. How to guarantee correction of 4 errors in all cases of Block Coding.?* Explain with suitable examples. For the generator string 101010 and data string 10110011 find the *CRC* and transmitted string. (5+5)

2. Discuss the design of Go-Back-N ARQ protocol. 13 data packets, if every 4th packet from A to B is lost, but no ACKs from B are lost, then how many frames are sent by A. (5+5)

3. *Describe a digital multiplexing technique to combine several low-rate channels to a high-rate channel.* (With diagram). Four 1 Kbps connections are multiplexed together. A unit is 1 bit. Find

(a) duration of one bit,

(b) Transmission rate of the link,

(c) the duration of the time slot,

(d) the duration of a frame. (2+8)