DATA COMMUNICATION SYSTEMS

ASSIGNMENT-1

1. What is an open system? Explain in detail about Open System interconnection (0SI).
2. What is data communication? What are the possible ways of data transmission? Explain with examples.
3. Explain in detail about different types of data communication networks.
4. Compare peer-to-peer client/server network and dedicated client/server network.
5. What is a topology? Explain the topologies in data communications?
6. Briefly describe the significance of Shannon limit for information capacity .For a standard telephone circuit with SNR of 30dB and a bandwidth of 2.7 kHz, determine the Shannon limit for information capacity.
7. What is the difference between electrical noise and thermal noise? For an electronic device operating at 17^0 C with a bandwidth of 10KHz. Determine the thermal noise power in watts and dBm.
8. What is a signal-to- noise power ratio? For a circuit with a signal power of 100w and a noise power of 0.002mw. Determine the signal-to-noise power ratio in absolute and dB values .
9. What is meant by M-ary encoding? Explain higher than binary encoding with an example.
10. Explain the method of generating AM wave with its block diagram.

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Assignment-2

1. What is a Transverse Electromagnetic Wave? Explain with a neat diagram.
2. Give the classifications of transmission line? Explain briefly.
3. What are the two kinds of waves? Explain in detail.
4. What are the primary blocks of the fiber optic cable? Explain.
5. What is an optical fiber mode? Explain the three practical types of optical fiber modes.
6. Give the advantages and disadvantages of optical fibers compared to metallic cables.
7. State Snell's law for refraction and outline its significance for optical fiber cables.
8. Draw the block diagram of optical fiber communication system and explain the each block in detail.
9. Explain the losses in a metallic transmission line.
10. Discuss the modes of propagation of light through an optical fiber cable.
11. Explain the characteristics of EM wave and give the classifications of transmission line.
12. Explain Numerical aperture with reference to ray theory transmission?
13. What is a laser? Explain in detail the four types of lasers.

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Assignment-3

1. Draw the block diagram of a PCM system and explain each block in detail.
2. Explain the process of Wave length division multiplexing and de multiplexing.
3. Briefly explain the T1 digital carrier system.
4. Explain the process of Time division multiplexing and de multiplexing.
5. Explain the four predominant methods of Pulse Modulation.
6. Draw the block diagram of a two channel PCM-TDM system and explain.
7. A PCM –TDM system multiplexes 24 voice band channels. Each sample is encoded into 7 bits and a framing bit is added to each frame. The sampling rate is 9000 samples per second. Determine the line speed.
8. Briefly describe the AT&T FDM hierarchy.
9. What is the relationship between dynamic range and the number of bits in a PCM? For a PCM system with the minimum dynamic range: 46dB, determine the minimum number of bits used in the PCM code.
10. What is a T carrier system? What is a fractional T carrier? Describe in detail the various T carrier systems.

Assignment-4

1. Give the optical properties of radio waves and explain.
2. Compare the advantage and disadvantages of different bands considering the effects of propagation media.
3. Define skip distance and derive an expression for skip distance.
4. Mention the different microwave regions & band designations.
5. Explain clearly the classification of microwave sources.
6. Discuss various generations of the wireless networks? Explain development of each generation clearly.
7. Discuss the various satellite services in brief?
8. Explain the concepts that aid to illustrate the effects of electromagnetic wave propagation.
9. State the advantages and disadvantages of geo-synchronous satellites.
10. Draw the block diagrams of microwave transmitter and receiver and explain their functioning.

Assignment-5

1. Explain the basic call telephone call procedure.
2. What are the major components of telecommunication network? Explain in detail about subscriber loop systems.
3. Draw the schematic and the present the working of a cellular system.
4. Explain the operation of N-AMPS cellular telephone systems.
5. What is paging system? Explain briefly.
6. Briefly explain the architecture of global system for mobile communication.
7. Write about the first generation and second generation cellular telephone systems.
8. Draw the block diagram of a telephone set and explain its components.

Assignment-6

1. Explain about the methods involved in error detection.
2. Write about the voice band modem.
3. Define the terms character framing and message framing.
4. Given data frame 1010011010 and generator polynomial x4+x2+1. Derive the transmitted frame.
5. Explain briefly the ITU-T voice band modem.
6. What is a modem? Compare synchronous and asynchronous modems. Explain the four types of modem operational modes.