

**Code No: V3124****R07****Set No: 1**

III B.Tech. I Semester Supplementary Examinations, November/December - 2012

**DATA COMMUNICATION SYSTEMS**

(Common to Computer Science and Engineering &amp; Information Technology )

**Time: 3 Hours****Max Marks: (80)**

Answer any FIVE Questions

All Questions carry equal marks

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- 1 a) Explain serial and parallel data transmission of signals.  
b) Define: (i) Signal to noise ratio (ii) information capacity (iii) bit rate.
- 2 a) Given a 100-watt power source, what is the maximum allowable length for following transmission media if a signal of 1 watt is to be received?
  - i. 22-gauge twisted pair operating at 1kHz.
  - ii. Optical fiber operating at its optimal frequency.b) Derive an expression for the material dispersion on the optimum profile for the pulse dispersion in graded index optical fibres.
- 3 a) Discuss different types of noise effects in delta modulation.  
b) Briefly explain linear and non-linear PCM codes. And also give the comparisons.
- 4 a) Define free-space propagation. Why TEM waves do not propagate well through lossy conductors?  
b) What are the requirements for satellites in geosynchronous orbits? What are the advantages and disadvantages of geosynchronous satellites?
- 5 a) Explain the relationships among telephone sets, local loops and central office switching machines.  
b) What is the basic purpose of call progress tones and signals? Explain them in detail.
- 6 a) Draw the architecture of GSM system and explain.  
b) Explain the different types of channel assignment schemes in cellular telephone system.
- 7 a) Describe data communications modems and write where they are used in the data communication circuits.  
b) Determine the check character for the nine-digit ZIP+4 number 85282-4220.
- 8 a) Assume that the primary HDLC station in NRM has sent six I-frames to a secondary. The primary's N(S) count was three (011 binary) prior to sending the six frames. If the poll bits are in the sixth frame, what will be the N(R) count back from the secondary after the last frame? Assume error-free operation.  
b) Discuss the different types and topologies of SDLC

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- 1 a) With neat sketches, explain layered network architecture.  
b) Briefly explain various digital modulation techniques.
- 2 a) Draw and Explain the Guided transmission configuration for point to point and multi point.  
b) Explain numerical aperture with reference to ray theory transmission?
- 3 a) Draw the block diagram of a PCM system and explain each block in detail.  
b) With the help diagram explain frame synchronization.
- 4 a) What is meant by a free space path loss of an electromagnetic wave? Give the mathematical equation in decibel form. Determine, in dB, the free space path loss for a frequency of 6 GHz traveling a distance of 50Km.  
b) Explain the following terms with respect to electromagnetic waves: (i) skip distance (ii) free space path loss (iii) terrestrial propagation.
- 5 a) Briefly explain the following: (i) paging system (ii) Transmission parameters.  
b) Explain the operation and basic functions of a standard telephone set.
- 6 a) What is frequency-division duplexing? Explain in detail.  
b) List the basic parameters of GSM and describe briefly the GSM radio subsystem.
- 7 a) What is a high speed modern synchronization? What are the purposes of scrambler and descrambler circuits? Illustrate with an example.  
b) Give a brief description of longitudinal redundancy checking.
- 8 a) What are the five fields used with an SDLC frame? Briefly explain each.  
b) Explain the different commands and responses in HDLC.

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**Code No: V3124****R07****Set No: 3**

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- 1 a) Briefly describe the significance of the Shannon limit for information capacity.  
b) Define analog and digital signals and describe the differences between them.
- 2 a) Explain the concept of Lasers and LEDs.  
b) List out the materials used and the desired features of a photo diode for usability in fiber optic links.
- 3 a) Derive an expression for the output signal to quantization noise ratio in a PCM system.  
b) Give the comparisons among FDM, TDM and WDM.
- 4 a) Describe the components that make up a radio link.  
b) What is a radio wave? What are the optical properties of radio waves? Explain all the details of how they relate to radio wave propagation.
- 5 a) Compare the operation of a cordless telephone and a standard telephone.  
b) What is meant by transmission line conditioning? Compare C-type and D-type line conditioning.
- 6 a) What are the three primary subsystems of GSM? Describe in detail the GSM system architecture.  
b) Briefly explain 1<sup>st</sup> generation analog cellular system.
- 7 a) What is a modem? Compare synchronous and asynchronous modems. Explain the four types of modem operational modes.  
b) How does exact -count encoding detect errors.
- 8 Give comparison between BISYNC, SDLC and HDLC protocols.

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**Code No: V3124****R07****Set No: 4**

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- 1 Explain about transmission of digital data with neat diagram and indicate the signals level at each and every stage.
- 2
  - a) Give and explain the characteristics of electromagnetic waves.
  - b) Discuss various modes of propagation supported in optical fibers
- 3
  - a) What do you understand by companding? Compare analog companding and digital companding.
  - b) What is super frame and extended super frame Time Division Multiplexing (TDM) format? Explain each with an example.
- 4
  - a) Give the concept of Electromagnetic polarization and explain.
  - b) Draw the block diagrams of microwave transmitter and receiver and explain their functioning.
- 5
  - a) With the help of neat block diagram explain the local subscriber loop.
  - b) Explain basic telephone call procedure.
- 6
  - a) Explain the Basic Telephone call procedure.
  - b) Explain about personal communication satellite system.
- 7
  - a) Explain the operation of start bit verification circuit.
  - b) List and describe the basic blocks of a voice -band modem.
- 8
  - a) Explain the different steps involved in assembling HDLC frame.
  - b) Explain in detail the four basic configurations of SDLC

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