

Code No: R22121

R10**SET - 1****II B. Tech II Semester, Supplementary Examinations, Dec – 2012****DATA COMMUNICATION**

(Information Technology)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. a) Explain about connection oriented and connection less data communication protocols.  
b) Define signal analysis and describe the following parameters  
i) Amplitude                      ii) frequency                      iii) phase                      (8M+7M)
2. a) Describe about wave propagation on metallic transmission lines.  
b) Give in detail about the block diagram of optical fiber communication systems.      (8M+7M)
3. a) Elucidate in detail about digital companding.  
b) For the following bit sequence, draw the timing diagram for UPRZ, UPNRZ, BPRZ, BPNRZ, and BPRZ-AMI : 1110010101100                      (8M+7M)
4. a) Delineate in detail about the advantages and disadvantages of microwave radio systems over cables.  
b) Determine the wave attenuation between two points with power densities  $P_1=25 \mu\text{W}/\text{m}^2$  and  $P_2= 0.05 \mu\text{W}/\text{m}^2$ .                      (8M+7M)
5. a) Explain how caller ID operates and when it is used.  
b) Define cross talk and explain about the three primary types of cross talk in telephone systems.                      (8M+7M)
6. a) Describe in detail about frequency reuse and Co channel interference.  
b) A cellular telephone company has acquired 150 full duplex channels for a given service area. The company decided to divide the service area into 15 clusters and use a seven cell reuse pattern and use the same number of channels in each cell. Determine the total number of channels the company has available for its subscribers at any one time.                      (8M+7M)
7. a) Describe in detail about how vertical redundancy checking accomplishes error detection.  
b) Determine the BCC for the following data and CRC generating polynomials:  
i)  $G(x) = x^7+x^4+x^2+x^0=10010101$   
ii)  $P(x) = x^5+x^4+x^1+x^0=110011$                       (8M+7M)
8. a) Give and explain in detail about the block diagram of voice band modem.  
b) List and explain the most common modulation methods used with 56k voice.                      (8M+7M)

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**R10****SET - 2**

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**DATA COMMUNICATION**  
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Answer any **FIVE** Questions  
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1. a) Define the open systems interconnection and briefly describe about the seven layers of OSI protocol hierarchy.  
 b) Determine the following for a binary FSK signal with a mark frequency of 49 kHz, a space frequency of 51 kHz and an input bit rate of 2 kbps.
    - i) Peak frequency deviation
    - ii) Minimum band width
    - iii) Baud

(8M+7M)
  2. a) Explain the difference between shielded twisted pair (STP) and unshielded twisted pair (UTP) transmission lines.  
 b) Describe about the propagation of light through an optical fiber cable.
 

(8M+7M)
  3. a) What is pulse code modulation? For a PCM system with the following parameters determine
    - i) Minimum sample rate
    - ii) minimum number of bits used in PCM code
    - iii) resolution and
    - iv) Quantization error

Maximum analog input frequency = 4 kHz  
 Maximum decoded voltage at the receiver =  $\pm 2.55$  V  
 Minimum dynamic range = 46 dB

 b) What is frame synchronization? How is it achieved in a PCM –TDM system?
 

(8M+7M)
  4. a) Explain about spherical wave front and also state inverse square law.  
 b) List and explain the three orbital patterns used by satellites.
 

(8M+7M)
  5. a) Give the basic functions of a telephone set.  
 b) Briefly describe about C-message noise weighting and state its significance.
 

(8M+7M)
  6. a) Describe in detail about call procedures involved in completing each of the three types of calls involving mobile cellular telephones.  
 b) Briefly explain about the digital cellular telephone.
 

(8M+7M)
  7. a) Describe character synchronization and explain the differences between asynchronous and synchronous data formats.  
 b) Determine the Honeywell checksum and residue check sum for the following five character ASCII message: HOUSE
 

(8M+7M)
  8. a) Discuss in detail about the features of voice band modems and give simplified block diagram for an asynchronous PSK modem.  
 b) What is meant by modem training and what are the purposes of scrambler and descrambler circuits?
 

(8M+7M)

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**R10****SET - 3****II B. Tech II Semester, Supplementary Examinations, Dec – 2012****DATA COMMUNICATION**

(Information Technology)

Time: 3 hours

Max. Marks: 75

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1. a) Describe about the classification of primary data communication networks.
b) Define the term information capacity and briefly describe about the significance of the Shannon limit for information capacity. (8M+7M)
2. a) Explain about metallic transmission line losses in detail.
b) State Snell's law for refraction and outline its significance for optical fiber cables. (8M+7M)
3. a) Describe about linear versus non linear PCM codes.
b) A PCM-TDM system multiplexes 24 voice-band channels. Each sample is encoded into seven bits and a framing bit is added to each frame. The sampling rate is 9000 samples per second. Determine the line speed in bps. (8M+7M)
4. a) Describe about the terrestrial propagation of electromagnetic waves
b) Explain about wave attenuation and wave absorption in detail. (8M+7M)
5. a) Explain about the basic telephone call procedures in detail.
b) Discuss in detail about transmission parameters and private- line circuits. (8M+7M)
6. a) Why was a honeycomb pattern selected for a cell area? Describe the differences between a cellular telephone service areas cluster and a cell.
b) Describe in detail about global system for mobile communications. (8M+7M)
7. a) Determine the VRC s and LRC for the following ASCII –encoded message(use even parity for LRC and odd parity for VRC): ASCII sp CODE
b) Explain why Morse code is inadequate for modern day data communications networks and also focus in detail about Baudot code. (8M+7M)
8. a) Describe in detail about bell system compatible modem.
b) Explain in detail about voice –band data communication modems. (8M+7M)

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R10**SET - 4****II B. Tech II Semester, Supplementary Examinations, Dec – 2012****DATA COMMUNICATION**

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1. a) Describe about the two basic kinds of data communication circuit configuration in detail.  
b) Explain about digital modulation in detail. (8M+7M)
2. a) Describe about the primary characteristics of electromagnetic waves.  
b) Explain in detail about the losses in optical fiber cables. (8M+7M)
3. a) Define signal voltage-to-quantization noise ratio and give its relationship to resolution, dynamic range and the number of bits in a PCM code.  
b) Explain about frame synchronization in detail and how is it achieved in a PCM-TDM system. (8M+7M)
4. a) Explain in detail about the optical properties of radio waves.  
b) Determine the power density for a radiated power of 1000 W at a distance i) 20 km and ii) 30 km from an isotropic antennas. (8M+7M)
5. a) Give and explain about the block diagram of telephone set.  
b) Briefly describe the following parameters: 1004-Hz variation, C-message noise, gain hits and drop outs, single frequency interference, phase jitter. (8M+7M)
6. a) Give the topology of cellular system and describe about cellular telephone network components in detail.  
b) Determine the co-channel reuse ratio for a cell radius of 0.5 miles separated from the nearest co-channel cell by a distance of 4 miles. (8M+7M)
7. a) For a 12-bit data string of 101100010010, determine the number of Hamming bits required, arbitrarily place the hamming bits into the data string, determine the logic condition of each hamming bit, assume that arbitrary single-bit transmission error, and prove that the hamming code will successfully detect the error.  
b) Define error control and relate it to probability of error and bit error rate. (8M+7M)
8. a) Define modem synchronization and list its functions.  
b) Explain in detail about synchronous voice band modems. (8M+7M)