

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

III B.Tech. I Semester Supplementary Examinations, April/May – 2013

**DATA COMMUNICATION SYSTEMS**

(Common to CSE, IT)

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

Answer any FIVE Questions  
All Questions carry equal marks

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1. a) Define the open systems inter connection. Briefly describe the seven layers of the OSI protocol hierarchy. [8M]  
b) Explain and compare man-made noise, thermal noise, correlated noise and impulse noise types. [8M]
2. a) Define the following:  
(i) Cable attenuation (ii) Cross talk (iii) Plenum (iv) Plenum cable [8M]  
b) State Snell's law for refraction and outline its significance for optical fiber cables - [8M]
3. a) What is a T carrier system? What is a fractional T carrier system? Describe in detail, the various T carrier systems. [8M]  
b) Compare WDM and DWDM and also list the advantages and disadvantages of WDM.
4. a) List and give examples of the three satellite operation categories [8M]  
b) Define the following:  
(i) Clarke orbit (ii) Free-space path loss (iii) Satellite foot print  
(iv) Look – angles [8M]
5. a) What are the merits and demerits of cordless telephones? [8M]  
b) Write about the local subscriber loop and channel noise [8M]
6. a) Explain the classification of CDMA radiated power. Determine the transmit power for a CDMA mobile unit that is receiving a signal from the base station at -100 dBm [8M]  
b) Briefly describe the E-TDMA scheme [6M]  
c) What is meant by the term sleep mode? [2M]
7. a) Determine the BCS for the following Data and CRC – generating Polynomials:  
Data  $G(x) = x^7 + x^5 + x^4 + x^2 + x^1 + x^0$   
 $= 1 0 1 1 0 1 1 1$   
CRC  $P(x) = x^5 + x^4 + x^1 + x^0$   
 $= 1 1 0 0 1 1$  [8M]  
b) What is high speed modem synchronization? What are the purposes of scrambler and descrambler circuits? Illustrate with an example. [8M]
8. a) Briefly describe the polling sequence for BSC, including the difference Between a general and specific poll? [8M]  
b) Compare SDLC and HDLC. Describe the HDLC operational modes? [8M]

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1. a) What is topology? Explain topologies in data communication? [8M]  
b) What are the various types of transmission modes and explain? [8M]
2. a) What is the relationship between bandwidth and information capacity? [4M]  
b) What properties of a transmission line determine its characteristic impedance? [4M]  
c) Determine the wavelengths for electromagnetic waves in free space with the Following frequencies:  
1 KHz, 100 KHz, 1 MHz and 1 GHz [8M]
3. a) What do you understand by companding?? Compare analog and digital companding.  
b) What is SQR and give its relationship to resolution, dynamic range and maximum no of bits in a PCM code. [8M+8M]
4. a) Describe  
(i) Ground wave propagation (ii) Space wave propagation (iii) Spherical wavefront  
(iv) Electromagnetic polarization [8M]  
b) Draw the block diagrams of microwave transmitter and receiver and explain their functioning? [8M]
5. a) Briefly describe what happens when a telephone set is taken off-hook? [4M]  
b) What is meant by the terms tip and ring. [4M]  
c) Describe attenuation distortion and envelope delay distortion? [8M]
6. a) What is meant by false-hands off and what are four types of hand offs possible with N-AMPS and explain them. [8M]  
b) Describe the differences between the radiated power classifications for USDS and AMPS [8M]
7. How logic '0's and '1's indicated  
a) With the code 39 barcode & POSTNET barcode [8M]  
b) Explain the following error detection schemes?  
(i) Double – precision checksum (ii) Honeywell checksum  
(iii) Residue check-sum (iv) Check character check-sum [8M]
8. a) What is a data link protocol? List and describe in detail the three data link protocol functions. [8M]  
b) What are the three frame formats uses with synchronous data link control (SDLC)? What are the purpose of the ns bit sequence, nr bit sequence, P bit and F bit? [8M]

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1. a) What is an open system? Explain in detail, about open systems inter connection? [8M]  
b) For an electronic device operating at  $17^{\circ}\text{C}$  with a bandwidth of 10KHz, determine the thermal noise power in watts and dBm. [8M]
2. a) Define velocity factor and dielectric constant and tell how they affect the performance of a transmission line? [8M]  
b) What is an optical fiber mode? Explain the three practical types of optical fiber modes? [8M]
3. a) What is the difference between FDMA, TDMA and CDMA? [8M]  
b) What is line speed and how is it determined? [8M]
4. a) What is radio wave? What are the optical properties of radio waves? Explain all the details of how they relate to radio wave propagation? [8M]  
b) Define the following terms how they relate to radio wave propagation.  
(i) refraction (ii) Reflection (iii) diffraction (iv) Interference [8M]
5. a) Describe the operation and basic functions of a standard telephone set? [8M]  
b) What is the basic purpose of call progress tones and signals? Explain them in detail? [8M]
6. a) What is N-AMPS cellular telephone system? Explain the operation of N-AMPS Cellular telephone system? [8M]  
b) Describe the differences between the CDMA radiated power procedures and AMPS? [8M]
7. a) How does exact-count encoding detect the errors? [6M]  
b) What is the difference between no parity and ignored parity? [4M]  
c) Briefly describe echoplex? [6M]
8. a) What is the go-ahead sequence & turnaround sequence? [4M]  
b) Briefly describe the following:  
(i) Sliding window method of flow control (ii) Stop and wait method of flow control  
(iii) Poll/select line discipline (iv) ENQ/ACK line discipline [12M]

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1. a) What is a constellation diagram? How it is used with PSK? [6M]  
b) Explain the minimum bandwidth required for a BPSK system and the bit-rate? [6M]  
c) Explain M-array? [4M]
2. a) Define numerical aperture and briefly describe the losses associated with optical fibers?  
b) Describe the electrical and physical properties of transmission lines? [8M+8M]
3. a) What is super frame and extended super frame TDM format? Explain with an example.  
b) What is frame synchronization and how it is achieved in PCM-TDM system. [8M+8M]
4. a) List and briefly describe the four most common methods of pulse transmission? [8M]  
b) Explain the terms skip distance, satellite footprint and give the advantages of geosynchronous satellites? [8M]
5. a) Determine  
(i) The power levels in dBm for signal levels of 10 mW and 0.5 mW.  
(ii) The difference between the two power levels in dB. [8M]  
b) When is D-type conditioning mandatory? What limitations are imposed with D-type conditioning? [8M]
6. a) Describe the following services  
(i) available mode (ii) Screen mode (iii) Private mode (iv) Unavailable mode  
b) Explain in detail with neat diagrams, the CDMA traffic channels? [8M+8M]
7. a) List and describe the four types of commands used with the Hayes AT command set?  
b) 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 an arbitrary single bit transmission error, and prove that the hamming code will successfully detect the error. [8M+8M]
8. a) What is synchronous data link control (SDLC)? Describe the various fields of SDLC frame format. [8M]  
b) What is an invert- on zero encoding? Obtain the non return to zero inverted (NRZI) encoding data stream: 100111001010100010111000111 [8M]

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