



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Fifth Semester, B.E. - Computer Science and Engineering

Semester End Examination; Dec. - 2015

Data Communications

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What are different types of network connections? List the merits and demerits of Mesh and Bus topologies. 6
- b. What is RFC? Explain its maturity levels and requirements levels. 7
- c. Draw the TCP/IP protocol suite and list the functionalities of each layer. 7
- 2 a. What are periodic and non periodic composite signals? A periodic signal has a bandwidth of 20 Hz. A highest frequency is 60 Hz. What is the lowest frequency? Draw the spectrum if signal contains all frequencies of the same amplitude. 6
- b. Consider a suitable signal; draw the different transmission impairment effects on original signals. 6
- c. State Shannon's channel capacity theorem. A telephone has a frequency range of 300 Hz to 3300 Hz and SNR (dB) of 35 dB. What is the maximum channel capacity? 8

UNIT - II

- 3 a. What are the characteristics of line coding? Encode the stream 101011 using RZ, Manchester and AMI. 6
- b. With suitable diagram, explain the three processes involved in PCM encoder. 10
- c. An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate. Draw the waveform of ASK, FSK, PSK for an input 10110101. 4
- 4 a. What is multiplexing? Bring out the important differences between FDM and WDM. 6
- b. With suitable example, explain how FHSS achieves bandwidth spreading. 6
- c. What are the applications of different wireless transmission media? Explain. 8

UNIT - III

- 5 a. What is solution to reduce cross points in switch? Explain its mechanism. 6
- b. What is Banyan switch? Draw banyan switch for 8 inputs and 8 outputs. 6
- c. What is the use of ARP? Explain its operation. 8
- 6 a. What are the steps involved in process of error detection and correction block coding techniques? Explain. 6

- b. We need a data word of at least 16 bits. Find the value of k and n in Hamming code $C(n, k)$ with $d_{\min} = 3$. 4
- c. Write the procedure of CRC encoder.
Given the data word 1010011010 and generator polynomial $x^4 + x^2 + x + 1$. Find the codeword at the sender site using binary division. 10

UNIT - IV

- 7 a. Draw the finite state machine for stop and wait protocol and explain its states at sender and receiver sites. 8
- b. What are the different HDLC frames? Explain their fields. 6
- c. Briefly discuss the services and frame format of PPP. 6
- 8 a. What is meant by vulnerable time of ALOHA? A pure ALOHA network transmits 200 - bit frames on a shared channel of 200 kbps. What is the throughput if the system produces 1000 frames per second and 250 frames per second? 6
- b. Compare and contrast CSMA / CD and CSMA / CA algorithms. 6
- c. With example describe the mechanism of CDMA. 8

UNIT - V

- 9 a. Write and explain Ethernet frame format. 7
- b. What are the goals of Fast Ethernet and Gigabit Ethernet? 6
- c. Distinguish between unicast, multicast and broadcast transmission. Define the type of the following destination addresses : 7
- i) 4A : 30 : 10 : 21 : 10 : 1A
- ii) 47 : 20 : 1B : 2E : 08 : EE
- iii) FF ; FF : FF : FF : FF : FF
- 10a. Explain the frame structure of 802.03 MAC sub layer. 6
- b. What are piconets? What are the Bluetooth layers? Explain. 6
- c. What are the functionalities of connecting devices? Explain. 8

* * * *