

2006 VISVESVARAYA TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.E DEGREE EXAMINATIONS

DATA COMMUNICATIONS

(INFORMATION TECHNOLOGY, COMPUTER SCIENCE ENGINEERING)

JANU / FEBRU 2006

TIME: 3 HOUR
MAXIMUM MARK :100

Note: 1. Answer any Five full questions.

1. (a) Briefly describe any five essential elements of network architecture.
- (b) Assume that n computers are connected in the following topologies:
 2. (a) A host computer is connected to a connection oriented packet switching network to a server through a point to point link. Show the sequence of layered services that take place between layer (n+1) of the host and that of the server through the respective lower layers (n) and deploying the required PDU's and SDU's.
 - (b) A scanner has a resolution of 600 * 600 pixels/square inch. How many bits are produced by on 8 inch * 10 – inch image. If scanning uses 8 bits/pixel? If this image is compressed at a ratio of 12. How long will it take to transmit this compressed image over a 56 Kbps transmission medium?
3. (a) Draw the Manchester encoding of the following binary sequence:
1 0 1 0 1 1 1 0 Why is Manchester encoding called as IB2 code?
- (b) Derive the expression for the band width of a Frequency Shift Keying (FSK) signal and hence determine the maximum bit rate of transmission, if the bandwidth of the medium is 12,000 Hz and the difference between the two carriers is 2000 Hz. Assume that the transmission is in full – duplex mode.
4. (a) Draw the diagram of a typical QAM – modulator and prove that its output $y(t)$ is given by: $(A \cos 2\pi f_c t + B \sin 2\pi f_c t)$
1
2
2
k k c k k y t = A + B p f t + B A where
Ak is in – phase component, Bk is quadrature component and f_c is centre frequency.
- (b) Draw the QAM – constellation diagrams of the following
 - i) 8 – QAM represented by 2 – amplitudes and 4 phases
 - ii) 16QAM represented by 3 amplitudes and 12 phases.
5. (a) Draw the structure of SONET frame STS1 at the line level and briefly describe the segments in it. Prove that the overall bit rate of STS – 1 is 51.84
- (b) In a TDM system, four channels of 1Kbps each are multiplexed together. Each time slot, called as a unit, carries 1 bit of information. Data from each time slot is transmitted as a frame. Find:
 - i) Transmission rate of the output link of the multiplexer
 - ii) The duration of a frame
6. (a) In the selective repeat ARQ, explain the meanings of: Slast, Spercent, Rnext, Ws&WR.
- (b) In HDLC protocol discuss the functions executed by the control frame.
7. (a) Derive the expression connecting the throughput S and the total arrival rate G in A slotted ALOHA system and hence derive the maximum value of the throughput.
- (b) Suppose a radio system uses 9600 bps channel for sending call setup request messages to a base station. Suppose that frames are 120 bits long. What is the maximum throughput possible with ALOHA and with slotted ALOHA.
8. Give a brief description of the following:
 - a) Repeaters
 - b) Loop problem in connecting LAN's using bridges
 - c) Cyclic Redundancy Check(CRC) in error detection
 - d) CSMA/CD