

CBCS SCHEME

18CS46



Fourth Semester B.E. Degree Examination, Feb./Mar. 2022 Data Communication

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. There are certain number of criteria's for a network. Name and discuss them. (05 Marks)
- b. Assume five devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? Draw the topology for 5 nodes. Compare with star topology. (07 Marks)
- c. A simple internet is shown in Fig. Q1(c). i) Show the TCP/IP protocol suite layers at each node ii) Describe the functions of first two layers of TCP/Ip protocol suite. (08 Marks)

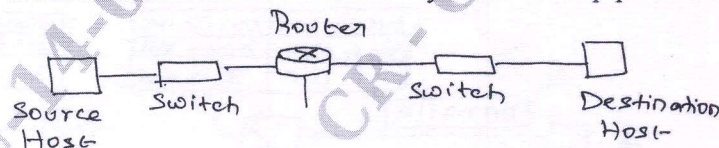


Fig.Q1(c)

OR

- 2 a. In protocol layering , encapsulation / decapsulation is one of the concept. With neat diagram, illustrate this process in TCP/IP protocol suite. (10 Marks)
- b. A device is sending out data at the rate of 1000 bps.
 - i) How long does it take to send out 10 bits?
 - ii) How long does it take to send out a single character (8 bits)?
 - iii) How long does it take to send a file of 100,000 characters? (05 Marks)
- c. We measure the performance of a telephone line (4 KHz of Bandwidth). When the signal is 10V, the noise is 5mV. What is the maximum data rate supported by this telephone line? (05 Marks)

Module-2

- 3 a. Explain the characteristics of line coding schemes. (08 Marks)
- b. Given the bit pattern 010011, plot the waveform for the following line coding schemes
 - i) NRZ - L
 - ii) NRZ - I
 - iii) RZ
 - iv) Manchester.Compare the schemes with respect to i) Ratio 'r' which is the number of data elements carried by each signal element ii) Average Signal rate. (12 Marks)

OR

- 4 a. What is PCM technique? For the given discrete values (sampled signal) $x(n)$, illustrate quantization and encoding process by computing :
 - i) Normalized PAM values.
 - ii) Normalized Quantized Values.
 - iii) Normalized error.
 - iv) Quantization code
 - v) Encoded word. Plot the discussion $x(n) = \{20, 15, 10, 5, -5, -9, -7, -6\}$. Assume : $L = 8$ and input $V_{max} = +20V$ and $V_{min} = -20V$. (12 Marks)
- b. Explain the concept of i) Binary frequency shift keying ii) Binary phase shift keying. (08 Marks)

Module-3

- 5 a. Ten sources, six with a bit rate of 200 Kbps and four with a bit rate of 400 Kbps are to be combined using multilevel TDM with no synchronizing bits. Answer the following questions about the final stage of the multiplexing :
- What is the size of a frame in bits?
 - What is frame rate?
 - What is the duration of a frame?
 - What is the data rate?
- (08 Marks)
- b. List Spread Spectrum techniques. Explain the technique which is based on hopping frequencies (carrier). (06 Marks)
- c. List different switching mechanisms. Choose the appropriate mechanism at physical layer, data link layer, network layer and application layer. (06 Marks)

OR

- 6 a. For the Virtual Circuit Network, shown in Fig.Q6(a), with neat diagram illustrate :
- Set – up request
 - Set – up acknowledgement.

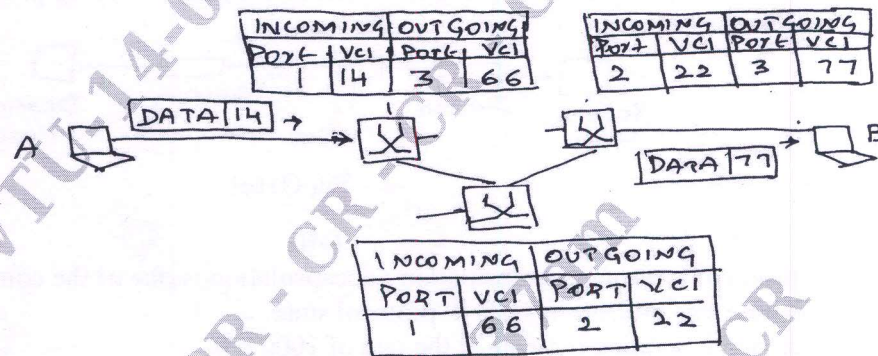


Fig. Q6(a)

(10 Marks)

- b. Explain the concept of checksum algorithm. Illustrate the algorithm for the given data for corrupted and uncorrupted cases.
Given data = {8, 13, 11, 0, 1}.

(10 Marks)

Module-4

- 7 a. Demonstrate taking an example, character oriented and bit oriented framing. (10 Marks)
- b. A network transmit 200bit frames on a shared 200 Kbps line. Compute the throughput for pure ALOHA and slotted ALOHA if the system produces
- 1000 frames/sec
 - 500 frames/sec
 - 250 frames/sec.
- Tabulate the values computed. (10 Marks)

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OR

- 8 a. Demonstrate the concept of IP address and Link – layer address, consider a small internet. (07 Marks)
- b. What is the role of Address Resolution Protocol (ARP)? Explain its Operation. (07 Marks)
- c. What is Classless Inter Domain Routing (CIDR)? Explain Address Aggregation Strategy with example. (06 Marks)

Module-5

- 9 a. For the Ethernet address : 07 : 01 : A2 : B3 : 64 : 55.
- How does it appear online in Binary?
 - How does it appear during transmission?
 - What is the type of address? Justify.

(04 Marks)

- b. Suppose the length of a 10 Base 5 cable is 2500m. If the speed of propagation in a thick co-axial cable is 2×10^8 m/s. How long does it take for a bit to travel from the beginning to the end of the network? Assume there is a $10\mu\text{sec}$ delay in the equipment. (06 Marks)
- c. Discuss the Implementation of Standard Ethernet. (10 Marks)

OR

- 10 a. Explain the following concepts of IEEE 802.11 Project.
i) Basic Service Set ii) Extended Service Set iii) Station types. (08 Marks)
- b. List the types of Bluetooth Architectures. Explain them. (04 Marks)
- c. In a 802.11, give the value of Address 1 , Address 2, Address 3 , Address 4. In each of the following situations dictated by 'TO DS' and 'From DS' fields.
i) 00 ii) 01 iii) 10 iv) 11. (08 Marks)

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