CBCS SCHEME

USN | | | | | | | | | | **18CS46**

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

Data Communication

Time: 3 hrs.   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)**

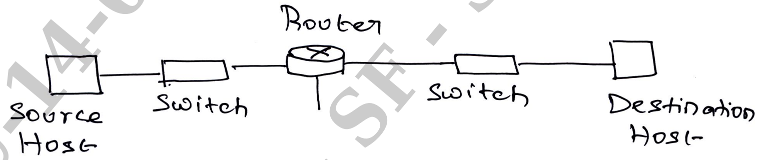

Fig.Q1(c)

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 valves (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)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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 sunchronizing bits. Answer the following questions about the final stage of the multiplexing :
i) What is the size of a frame in bits? ii) What is frame rate?
iii) What is the duration of a frame? iv) 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 :
i) Set – up request ii) Set – up acknowledgement.

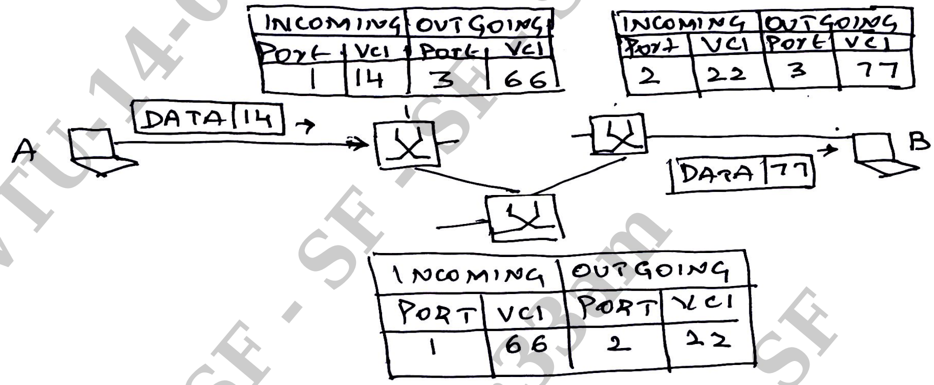

Fig. Q6(a) **(10 Marks)**

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 throughout for pure ALOHA and slotted ALOHA if the system produces
i) 1000 frames/sec ii) 500 frames/sec iii) 250 frames/sec.
Tabulate the values computed. **(10 Marks)**

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.
i) How does it appear online in Binary?
ii) How does it appear during transmission?
iii) 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 10μsec 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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