B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E.   **Semester: V**
Branch: Computer Science and Engineering   **Duration: 3 hrs.**
Course Code: 20CS5PCCON   **Max Marks: 100**
Course: Computer Networks   **Date: 07.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
                  2. Missing data, if any, may be suitably assumed.

UNIT - I

1	a)	Define protocol. With a neat diagram explain logical connections between layers of the TCP/IP protocol suite.	**8**
	b)	Explain various types of addresses used to achieve network communication, mention their structure with suitable example.	**6**
	c)	Define line coding. Explain the following terms and mention which of the line coding schemes overcomes these features. 1. Baseline wandering. 2. DC component. 3. Error detection 4. Immunity to noise and interference.	**6**

UNIT - II

2	a)	The message is expressed in polynomial $m(x)= x^7+x^6+x^5+x^2+x$ and the generator polynomial $g(x)= x^4+x^3+1$. Determine the CRC at the sender. Assuming no errors in transitions, prove the same with CRC computation at the receiver.	**6**
	b)	Define checksum. Explain the process of computing checksum at the sender and receiver.	**6**
	c)	List the data link control functions. Discuss the importance of framing, with neat diagrams explain different types of framing.	**8**

OR

3	a)	With a neat diagram discuss the encoder and decoder of CRC(7,4). Determine the CRC for the data word- 1001 and the divisor- 1011.	**6**
	b)	Suppose that the data 10011001111000100010010010000100 is to be sent to the receiver. Compute the checksum of 8 bits at the sender. Assuming 1 bit error at any position, show how the error gets detected at the receiver.	**6**

UNIT - III

4 a) Consider a datagram network that uses 8-bit host addresses. Suppose a router **8** has the following forwarding table entries:

| Prefix Match	Interface
130.24.40.0 /26	1
130.24.40.64 /27	1
130.24.40.96 /27	1
130.24.40.127/ 26	1
130.24.40.128/25	0

    i) For each of the five interfaces, give the associated range of host addresses and the number of addresses in the range.

    ii) Is it possible to super net these subnets? if so draw the supernetted network and relevant supernet masks.

b) Consider the following IP header fields obtained from wire shark application: **4**
4500 0125 71ba 4000 3f06 6816 a3ac cfa6 ac10 419f, determine the following from the above dump.
    i) Total length of IP packet.
    ii) Time to Live.
    iii) Header checksum
    iv) Source IP address.

c) Apply Bellman-Ford algorithm to the network given below: Provide the new **8** routing table for node B that consist of best outgoing line and cost, when it receives the vectors from A:(0, 1, 4, 4, 2,5), E:(5, 1, 1, 1,0,4) and C:(4, 3, 0, 2, 1, 2)
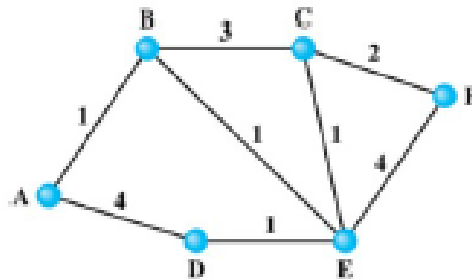

OR

5   a) Consider the network setup shown in Figure. Assuming ISP assigns the router   **8**
the address **24.34.112.235** and that the network address of the home network is
192.168.1.0/24.
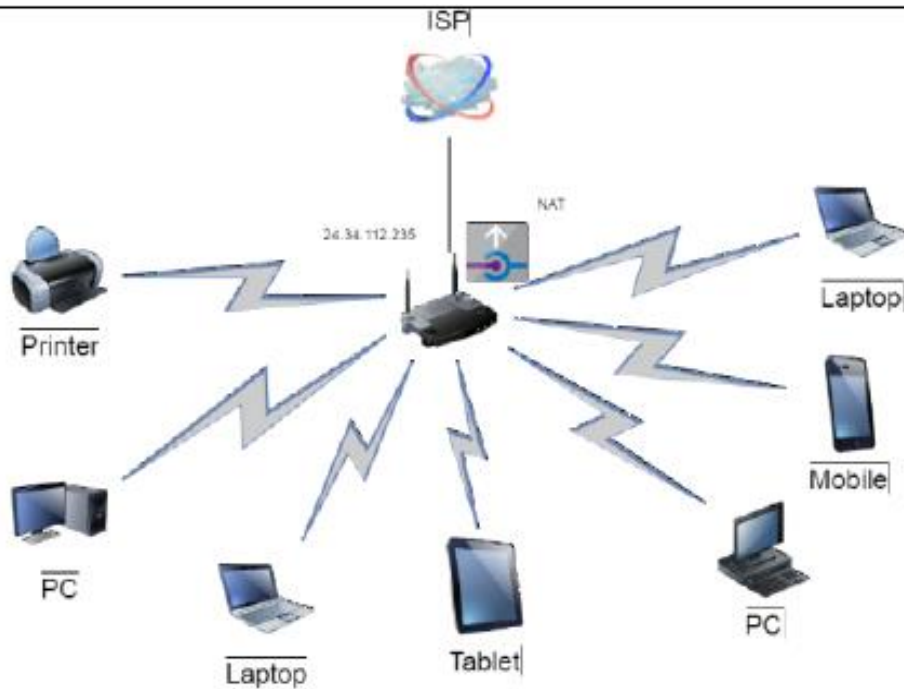
i.   Assign addresses to all interfaces in the home network.
ii.   Suppose each host has a ongoing TCP connections, all to port 80 at host
128.119.40.86. Provide the six corresponding entries in the NAT
translation Table.
iii.   Determine the class of address assigned by the ISP.
iv.   If a new device is assigned to the network, how does the device obtain a
new IP address?

b)   For the network given, give the datagram forwarding table for each node. The   **12**
links are labelled with relative costs; Prepare table that forwards each packet
via the lowest-cost path to its destination.
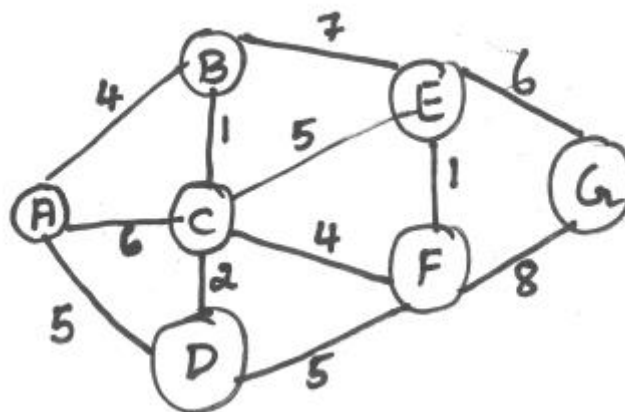
6 a) Discuss various services provided by transport layer to application layer. **8**

   b) Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. With the appropriate timing diagram answer the following: **4**
       i.   Analyze how much data is in the first segment?
       ii. Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgment that Host B sends to Host A, what will be the acknowledgment number?

   c) Mention the drawbacks of Stop and wait and Go-back N protocols. Explain how Selective Repeat protocol is efficient with its working. **8**

UNIT - V

7 a) With a neat diagram discuss various application layer paradigms. Mention their advantages and disadvantages. **8**

   b) Define URL. With an example discuss the components of the URL **6**

   c) Explain the structure of request message of HTTP protocol. Discuss various types of request messages. **6**

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