UPES
End Semester Examination, May 2023

Course: Data Communication and Computer Networks   **Semester: IV**
Program: B.Tech CSE   **Time: 03 hrs.**
Course Code: CSEG 2009   **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?	**4**	**CO1**
Q 2	Consider the same noiseless channel transmitting a signal with four signal levels (for each level, we send 2 bits). Calculate the maximum bit rate.	**4**	**CO1**
Q 3	Suppose a computer sends a packet at the network layer to another computer somewhere in the Internet. The logical destination address of the packet is corrupted. What happens to the packet? How can the source computer be informed of the situation?	**4**	**CO2**
Q 4	What is the congestion control mechanism in TCP? Explain with a suitable diagram.	**4**	**CO4**
Q 5	Explain the concept and need for supernet in the network with example.	**4**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

| Q 6 | Consider the given topology (Fig. a) and the vectors received by router J from its neighbors. Based on this information calculate the new routing table of J. Show the detailed calculations. | **10** | **CO3** |
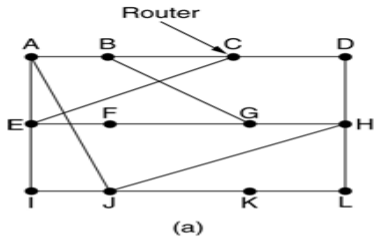
(a)

OR

Explain the count-to-infinity problem with example, and justify the statement "It reacts rapidly to good news but leisurely to bad news".

Q 7	Explain the TCP/IP protocol suite in detail with a suitable diagram with the functions of each layer.	**10**	**CO1**
Q 8	Write short notes on: a. HTTP b. FTP c. SNMP d. DNS	**10**	**CO4**
Q 9	A sloted ALOHA network transmits 200 bit frames using shared channel with a 200 kbps bandwidth. Find the throughput if the system (all station together) produces 250 frames per second.	**10**	**CO2**
Q 10	Encode a binary word 11001 into the even parity hamming code.	**10**	**CO2**

SECTION-C
(2Qx20M=40 Marks)

Q 11	An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Find the first and last address of each Organization including the unallocated address. Also, calculate the subnet mask and broadcast address of each organization.	**20**	**CO3**
Q 12	A TCP connection is using a window size of 1000 B and the previous acknowledgment number was 22,001. It receives a segment with acknowledgment number 24,001. Draw a diagram to show the situation of the window after and before the acknowledgment is received. If the window size is changed to 11000 B and 9000 B separately then what will be the situation. **OR**	**20**	**CO4**

The following is part of a TCP header dump (contents) in hexadecimal format.

E293 0017 00000001 00000000 5002 07FF

a. What is the source port number?
b. What is the sequence number?
c. What is the acknowledgment number?
d. What is the length of the header?
e. What is the window size?