VIT
Vellore Institute of Technology

SCHOOL OF ELECTRONICS ENGINEERING

Continuous Assessment Test – I, January 2020

Winter Semester, 2019-2020

Duration: 90 Mins.

Course Code : ECE 3030

Course Name : Principles of Computer Communication

Max. Marks : 50

Slot: D2

Faculty In-Charge : Dr. Suresh Chavhan

General instruction(s):

a. Provide appropriate illustration, wherever necessary.

b. Assume relevant address, wherever necessary.

Answer ALL Questions

S.No.	Question	Course Outcome (CO)
1.	Suppose users share a 1 Mbps link. Also suppose each user requires 100 Kbps when transmitting, but each user only transmits 10% of the time.	
	a) When circuit-switching is used, how many users can be supported? **(1M)**	CO2
	b) Suppose packet-switching is used. Find the probability that a given user is transmitting. **(3M)**	CO2
	c) Suppose there are 40 users. Find the probability that at any given time, n users are transmitting simultaneously. **(3M)**	CO2
	d) Find the probability that there are 10 or more users transmitting simultaneously. **(3M)**	CO2
2.	a) What are the five layers in the Internet protocol stack? What are the principle responsibilities for each of these layers? **(5M)**	CO1
	b) Define the following internetworking devices: i) Repeaters, ii) Hubs, iii) Switch, and iv) Bridges. **(5M)** 3	CO2
3.	(a) Draw the timeline diagram of following cases: i) data is corrupted and ack/nack is good, ii) data is lost & ack/nack is good, iii) data is good and ack is corrupted, iv) data is good and ack is lost, and v) delayed ack beyond timeout. **(5M)**	CO1
	(b) Derive the Stop-and-Wait ARQ efficiency in channel with errors. **(5M)**	CO2
4.	(a) Suppose we want to transmit the message 11001001 and protect it from errors using the CRC polynomial $x^3 + 1$. Calculate the CRC at sender and receiver. **(5M)**	CO2
	b) Generate the 8 bit checksum for the following sequence: 10110011 10101011 01011010 11010101. **(5M)**	CO2
5.	For the given below network, write the relevant algorithm and find the root switch, root ports, designated ports and blocking ports. Assume that workstation S as source node connected to LAN 6 and workstation D as destination node connected to LAN 1. Sketch the single route and all-routes broadcast frames during route discovery. **(10M)**	CO1

LAN7

3
2 B4
2
LAN6

B5
2

B6
2

1
1
LAN5

1
LAN4

2
B1

LAN3
1

2
B3

3
B2
2

1
LAN2

1
LAN1
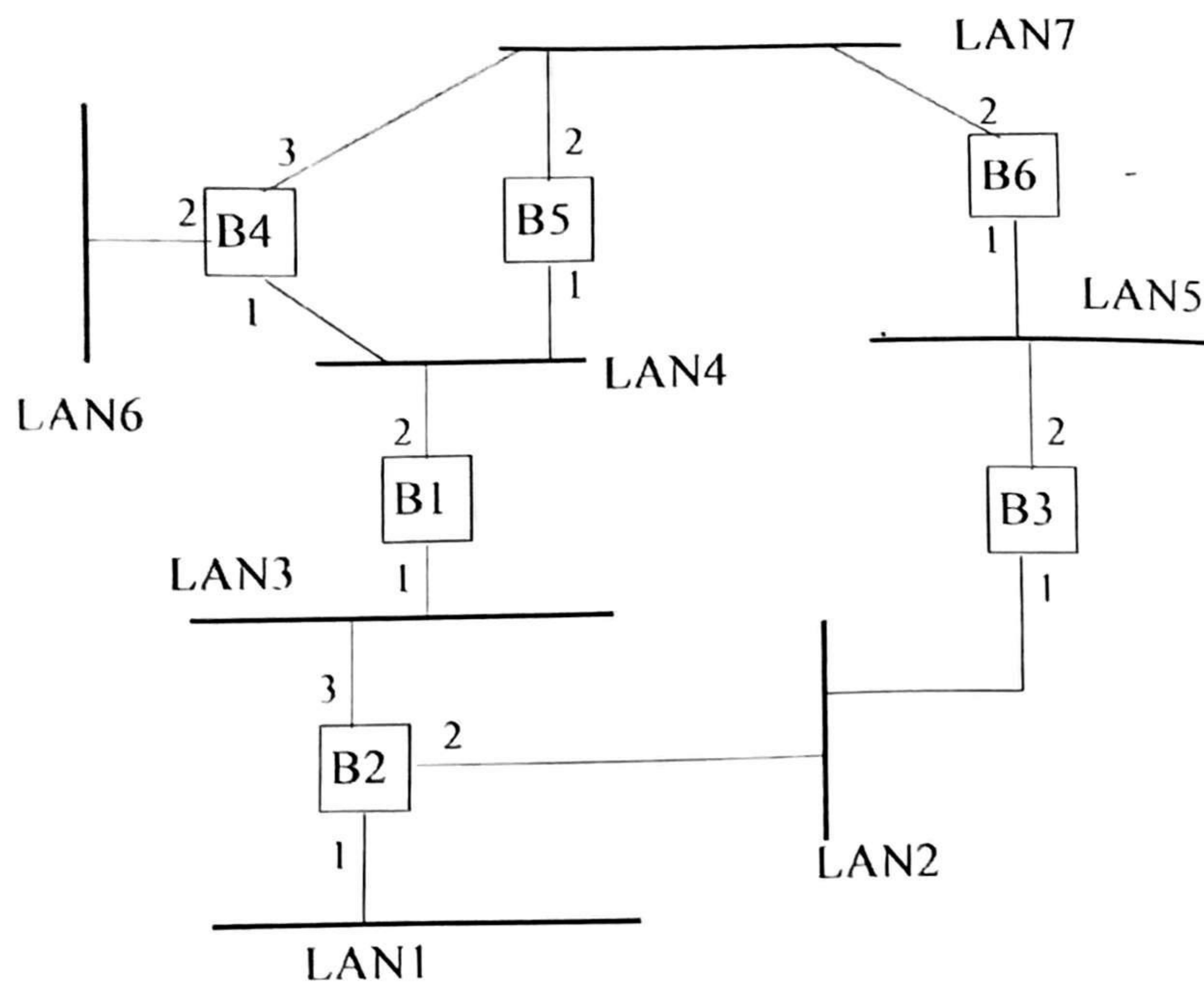
Note: Lowest MAC address is B1 and highest MAC address is B6.