

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
(MID-SEMESTER EXAMINATION SP/2024)

**CLASS: B. TECH**  
**BRANCH: ECE**

**SEMESTER: VI**  
**SESSION: SP/2024**

**SUBJECT: EC351 COMPUTER NETWORKING**

**TIME: 02 Hours**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 5 marks and a total of 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper, etc., if applicable, will be supplied to the candidates

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- Q.1(a) Discuss the operational differences with examples between the following: [2 1 2]  
 i) CSMA/CD and Token Ring under heavy load conditions.  
 ii) Type 1 and Type 3 services of LLC (Logical link control) sublayer.
- Q.1(b) The following assumptions are true in a 3-station ring architecture that uses the FDDI ring standard as a MAC protocol. i) Traffic consists of fixed-length frames, ii) TTRT=80 frame times, iii)  $SA_i = 40$  frame times for each station, iv) The total overhead during one complete circulation is 6 frame times (2 frame time per station). The below table is given for one token circulation when no frames are sent. Assuming frames are sent from 2<sup>nd</sup> token circulation onwards, show the table entries for the next 3 token circulations. [3 1 3]

Station A				Station B				Station C			
Arrival Time	TR T	SYN C	ASY NC	Arrival Time	TR T	SYN C	ASY NC	Arrival Time	TR T	SYN C	ASY NC
0	80	0	0	2	80	0	0	4	80	0	0

- Q.2(a) What is the significance of slot time in an Ethernet? How does it affect the maximum network length? Discuss carrier extension and frame bursting features of Gigabit Ethernet. [2 1 2]
- Q.2(b) Figure 1 shows an internet configuration where costs are marked on the bridges. Assuming all the bridges are in working condition, form the spanning tree with B6 as the destination root bridge and mark all route ports, designated bridges, and designated ports. [3 1 3]
- Q.3(a) What is ICMP? Where is it used? Discuss the messages used by ICMP in the following scenarios. [2 2 1]  
 i) If the router is unable to handle the flow of fragments.  
 ii) if the router is unable to reach the destination.
- Q.3(b) A 4480-octet datagram is to be transmitted and needs to be fragmented because it will pass through an Ethernet with a maximum payload of 1500 Octets. Show the Total length, More Flag, and Fragment offset values in each of the resulting fragments in a tabular form. [3 2 3]
- Q.4(a) What are the advantages of sub-netting? What is the Network ID, Broadcast Address, and first & last valid IP on the sub-network to which the host 192.168.1.15 belongs if the given subnet mask is 255.255.255.248? [2 2 1, 3]
- Q.4(b) Compare the individual fields of the IPv4 header with the IPv6 header. Account for the functionality provided by each IPv4 field by showing how the same functionality is provided in IPv6. [3 2 2]
- Q.5(a) What is IGMP? Why is it required? Explain the procedure for joining and leaving a multicast group as specified in IGMPv3. [2 2 1]
- Q.5(b) Suppose 1MByte of application data (including application layer header) has to be sent out of a host attached to Ethernet. Assume the application uses the TCP protocol, and the IP and TCP header are 20 bytes each. Further, assume that the Ethernet Maximum Transmittable Unit (MTU) size is 1500 bytes and TCP uses segments of size 1480 bytes. [3 2 3]  
 i) How many datagrams are sent out of the host?  
 ii) What is the last datagram's size (in bytes)?

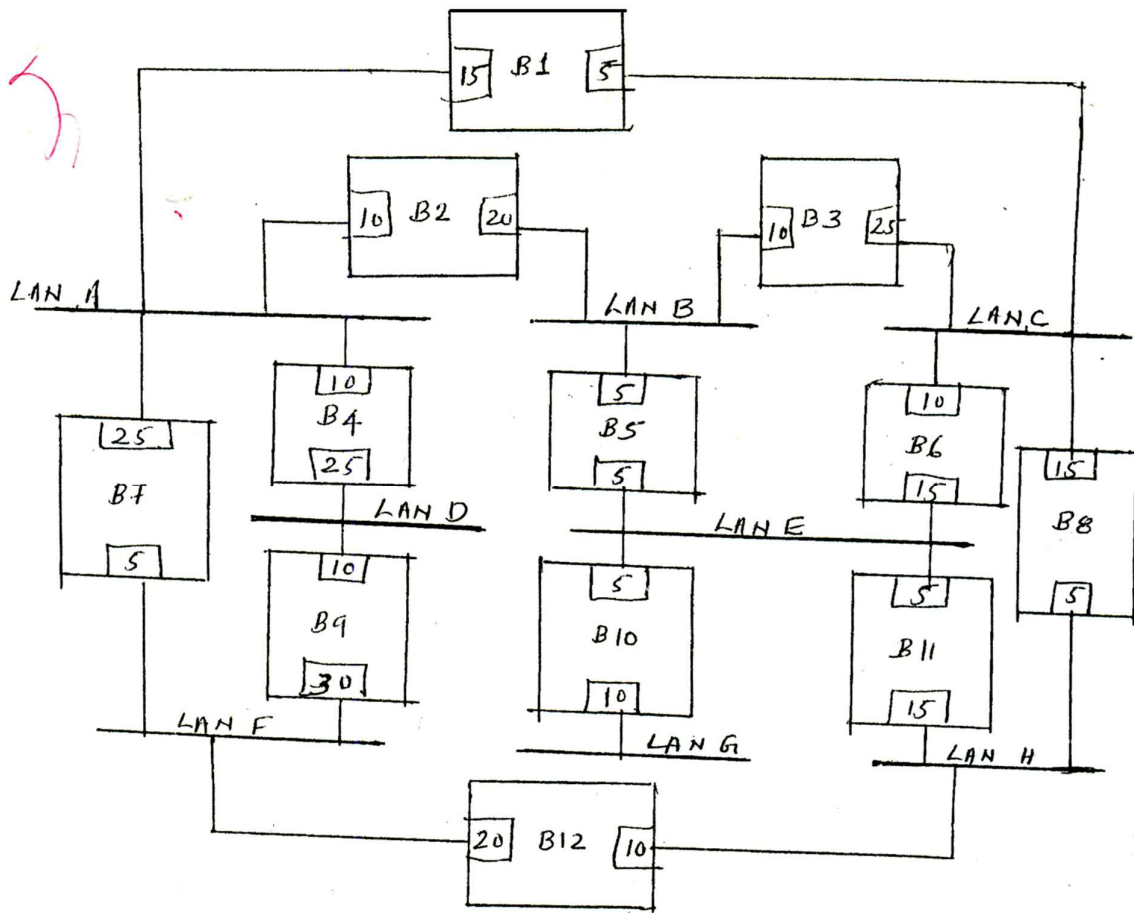


Figure - 1