DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
THIRD SESSIONAL
SUBJECT: (CE-611) COMPUTER NETWORKS

Examination : B.Tech Semester VI

Date :18/03/2025

Time : 2:30 PM to 3:45 PM

Seat No. :

Day :Tuesday

Max. Marks : 36

Q.1 **Do as directed.** [12]

CO4 E (a) If the TCP round-trip time, RTT, is currently 30 msec and the following acknowledgements come in after 26, 32, and 24 msec, respectively, what is the new RTT estimate using the Jacobson algorithm? Use $\alpha = 0.9$. [2]

CO2 N (b) From which states, a TCP client can enter in *TIME WAIT* state? [2]

CO4 R (c) Which Ethernet address is used for the destination in an RARP request? Which Ethernet address is used for the destination in an ARP request? [2]

CO1 N (d) Compare and contrast the network devices: repeater and switch. [2]

CO2 U (e) Explain roles of SMI and MIB for network management. [2]

CO1 A (f) What is the ratio of useful data to the entire frame for the largest Ethernet frame? [2]

Q.2 **Attempt *Any TWO* from the following questions.** [12]

CO2 N (a) (i) How is *traceroute* implemented?

(ii) What is Karn's algorithm? [6]

CO2 C (b) Assume that Alice wants to send message M=10 to Bob using RSA Crypto-system.

(i) Who should do the Key generation? Why? Assume prime numbers used for key generation are 11 and 13 and encryption key e as 7. Apply Key Generation algorithm and obtain Private, Public key pairs. [6]

(ii) Encrypt the message M and show that the decryption gives back the M. Show necessary steps of computation.

CO2 A (c) (i) Explain the use of the pseudo header. When is it used? Is it transmitted with the datagram? [6]

(ii) How Does IGMP Work?

Q.3 **Answer the following questions.** [12]

CO1 C (a) Five stations (S1-S5) are connected to an extended LAN through transparent bridges (B1- B2), as shown in the following figure. Initially, the hash tables are empty. Show how the hash tables of bridges change after each of the following events happen in sequence: S1 transmits to S5, S3 transmit to S2, S4 transmits to S3, S2 transmits to S1, and S5 transmits to S4. [6]
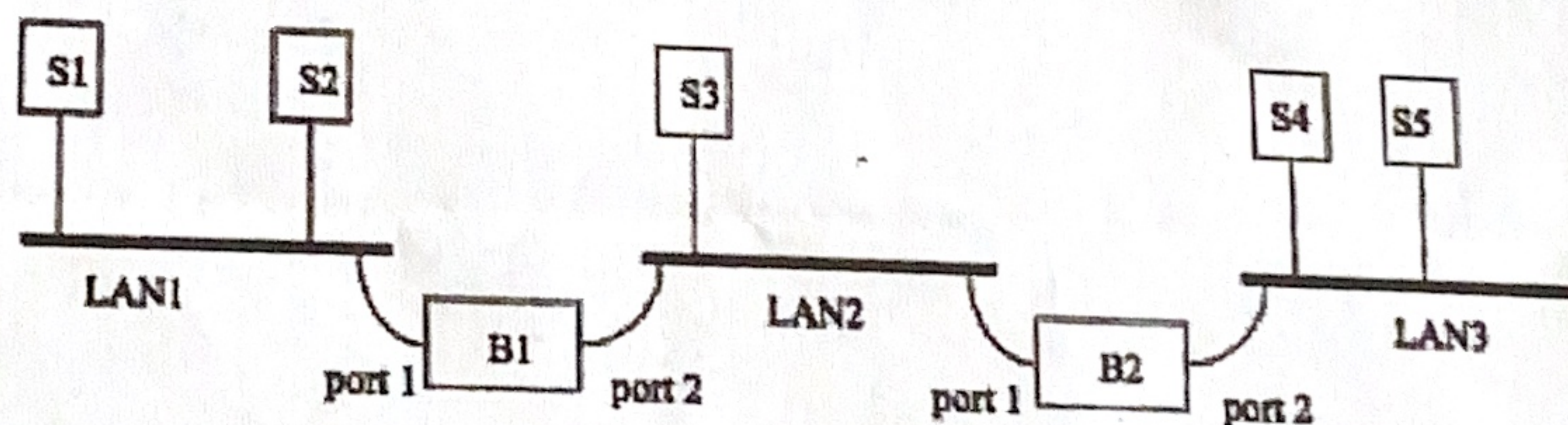
CO4 A (b) Sixteen stations, numbered 1 through 16, are contending for the use of a shared channel by using the adaptive tree walk protocol. If stations 2, 7, 8, 11, 12, 14, 15 and 16 suddenly become ready at once, how many bit slots are needed to resolve the [6]

contention? Draw the binary tree defining the tree walk. How many slots are needed to resolve the contention if improved algorithm suggested by Bertsekas and Gallager is used? Show your calculations.

<div align="center">OR</div>

Q.3   **Answer the following questions.**   [12]

CO1 C (a) What is the baud rate of a network operating at 1 Gbps with Manchester encoding? [6] Sketch Manchester and differential Manchester encoding for the bit stream: 0001110101.

CO4 A (b) In a CSMA/CD network Propagation Delay between Station A and Station B is 25.6 [6] μsec. Consider that network is running at the data rate of 10 Mbps. Both Stations have Frame time Tfr = 120 μsec. Station A sends a frame to Station B at time T=0.0 μsec and station B sends a frame to Station A at 23.0 μsec. Do frames collide? If yes, will station A and B detect the collision? If yes, how long will stations A and B take to detect the collision? Find the number of bits station A and B have sent before detecting the collision. Show your calculations.