**Dept. of Computer Science and Engineering (AI & ML) &
Computer Science and Engineering (Cyber Security)**

**Programme: B E – Computer Science and Engineering
(AI&ML) and CSE (Cyber Security)**
Internal Assessment – II

TERM:15th April 2024 – 22nd July 2024	COURSE NAME: **Data Communication and Networking**
DATE:**25-07-2024** TIME: **9.30-10.30**	COURSE CODE: **CY42/CI42**
MAX MARKS: **30**	PORTIONS: **L20 to L42**

Mobile Phones are banned

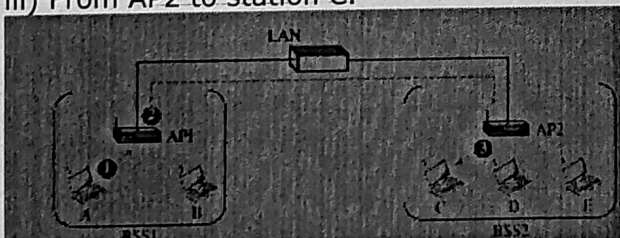Instructions to Candidates: **Answer any two full questions**. Marks: **15x2=30**

Q. NO	Questions	Blooms Levels (L1 to L6)*	CO	Marks
1.a	Consider that you are tasked with designing the communication protocol for a smart home system. Your goal is to ensure that all devices can communicate effectively without overwhelming the network. To implement it, the two protocols, ALOHA and CSMA, are to be compared and decide upon which one to implement based on their efficiency and persistence methods.	L4	CO4	5
1.b	Compare and contrast byte-stuffing and bit stuffing with appropriate examples.	L4	CO3	5
1.c	Two wireless networks, BSS1 and BSS2, are connected through a wireless distribution system DS as shown in Figure 1(c). Assume station A in BSS1 needs to send a data frame to station C in BSS2. Show the value of addresses in 802.11 frame for three transmissions and i) From station A to AP1, ii) From AP1 to AP2, iii) From AP2 to station C. Figure 1(c) Wireless LAN	L3	CO5	5
2.a	Consider that you are designing the communication protocol for a smart home system that includes a security camera sending video data to a central server. The data must be transmitted reliably, with each packet acknowledged before sending the next. To achieve this, you choose the Stop and Wait protocol. Explain how it can be implemented with a timing diagram.	L3	CO3	5

2.b	Describe connecting devices with a neat diagram. Compare and contrast hubs, switches and routers.	L3	CO5	5
2.c	Consider that you are designing a communication protocol for a smart home system that ensures devices can communicate efficiently without collisions. To achieve this, explain how the CSMA/CA protocol helps devices avoid collisions by using a combination of channel sensing and backoff strategies.	L2	CO4	5
3.a	Explain the Ethernet frame format with a neat diagram.	L2	CO5	5
3.b	Illustrate how the two controlled access protocols: Reservation and Polling help in designing a communication protocol for a smart home system to ensure efficient and orderly access to a shared communication link?	L2	CO4	5
3.c	In a smart home system, reliable data transmission between devices is essential for seamless operation. The Stop and Wait protocol is one method used to ensure data packets are delivered correctly. However, this protocol has some inherent issues that can impact performance. To address these issues, the Stop and Wait Automatic Repeat Request (ARQ) protocol has to be implemented. List the issues in stop and wait and explain how they can be handled using Stop and wait ARQ with suitable timing diagrams.	L4	CO3	5