

ชื่อ.....รหัส.....

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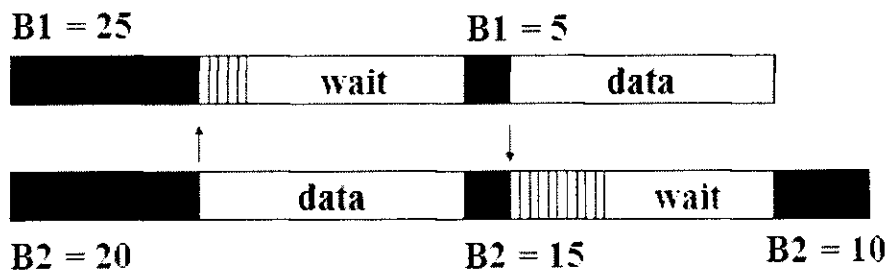
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3. 2 Ethernet stations are using CSMA/CA to communicate to each other. Station 1 and Station 2 have backoff interval B_1 and B_2 respectively, as given in the figure below. Please describe its working sequence, given by the table below. (10 marks)



Step	Station 1	Station 2
1		
2		
3		
4		

Answer

Step	Station 1	Station 2
1		
2		
3		
4		

4. Below figures show signal sequence diagram of how CSMA/CA works. Please describe the following signals: DIFS, RTS, CTS, ACK, SIFS, and NAV. (10 marks)

ชื่อ.....รหัส.....

- 6. A) What is the main difference between multi-antenna and MIMO in WLAN?
- B) What is the main difference between antenna beamforming and diversity?

Answer

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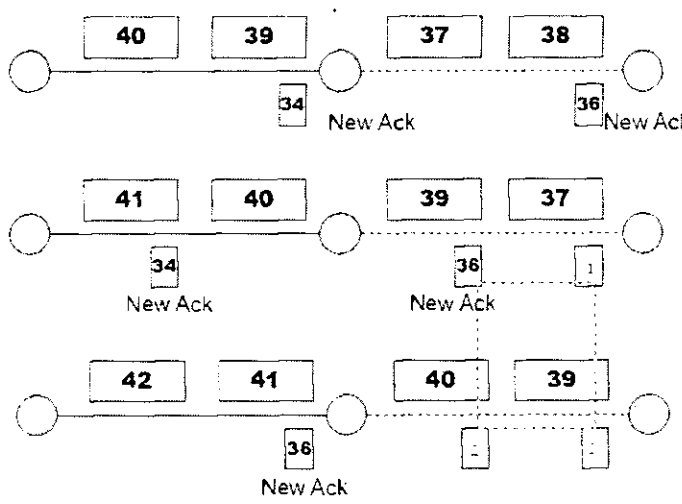
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13. TCP has deployed cumulative acknowledgements where an acknowledgement acks all contiguously received data. TCP assigns byte sequence numbers, for simplicity, we will assign packet sequence numbers. A new cumulative acknowledgement is generated only on receipt of a new in-sequence packet. A dupack is generated whenever an out-of-order segment arrives at the receiver. According to this rule, please put on acknowledgement numbers in 1, 2, and 3. (5 marks)



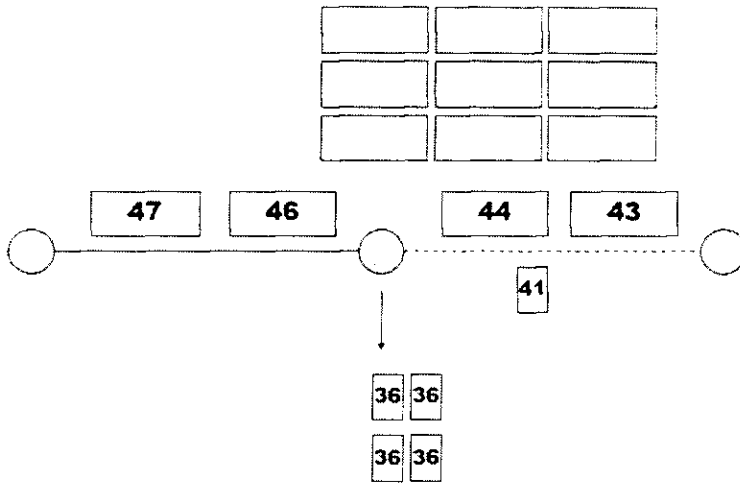
Answer

1)

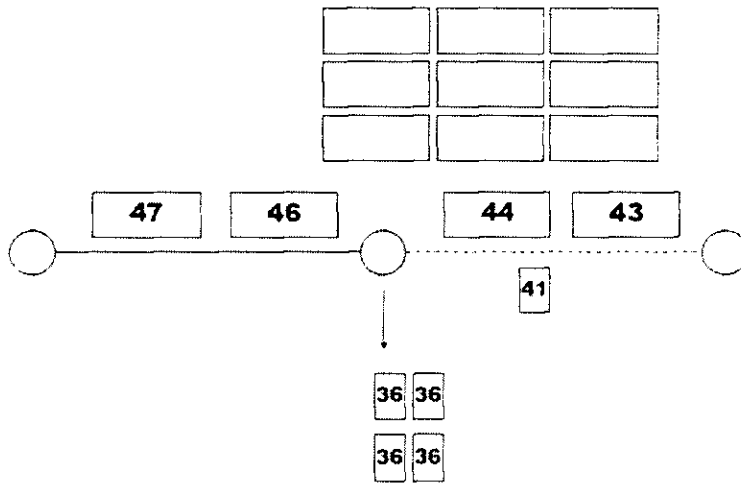
2)

3)

14. This is TCP Snoop Protocol. TCP Snoop Buffers data packets at the base station BS, to allow link layer retransmission. When dupacks received by BS from MH, retransmit on wireless link, if packet present in buffer. Please fill in packet numbers to all bank boxes given below:



Answer *Please fill in the blank boxes



15. What are the advantages and disadvantages of TCP Snoop Protocol?

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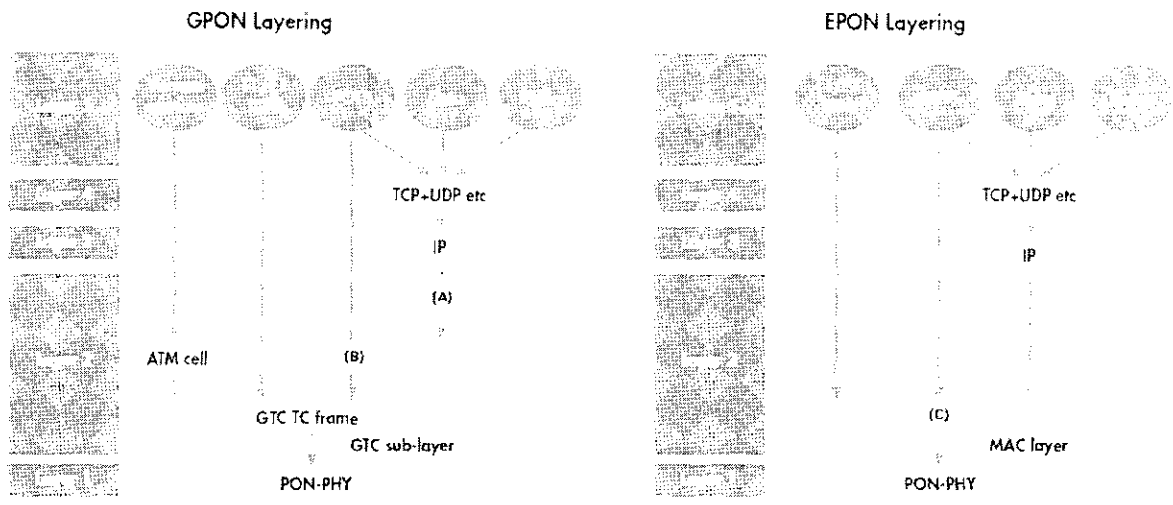
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16. In mobile environment, Mobile TCP (M-TCP) performs a better performance than a regular TCP. Please describe how M-TCP works.

Answer:

17. Ethernet Passive Optical Network (EPON). Sometimes called GEAPON (Gigabit Ethernet Passive Optical Network), and has been defined by IEEE standard. In contrast, Gigabit Passive Optical Network (GPON) has been defined by ITU in ITU Standard G.984.

(a) below are GPON layering and EPON Layering. Please finish all the missing boxes (A), (B), and (C); what their names are.



Answer:

- A)
- B)
- C)

(b) Please describe GPON & EPON similarity.

Answer:

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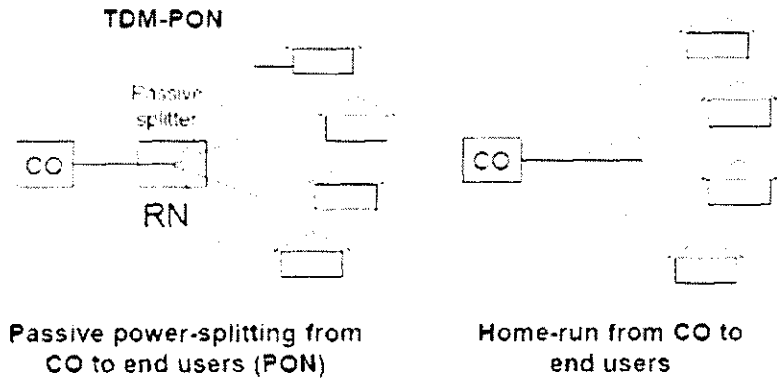
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18. Passive FTTH network or passive optical network (PON) is playing an important role on today network service and access technology. TDM-PON (Time Division Multiplexer PON) and Home-

run from CO to end users or point-to-point Home-run are competitors to provide a high speed access network. Please make a comparison between both of them



Answer

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19. What are major LTE radio technologies?

Answer

- 1)
- 2)
- 3)
- 4)
- 5)

20. คำสั่ง: ตอบถูกได้ข้อละ 2 คะแนน ตอบผิดลดคะแนนข้อละ 1 คะแนน

ส่วนนี้ให้ตอบ "T" หมายถึงถูก "F" หมายถึงผิด

1. [_] TDMA is inefficient for low duty factor traffic
2. [_] Aloha gives much lower delays, at the price of lower utilization
3. [_] In wireless communications, signal fading is caused by multi-path effect.
4. [_] DSSS gives better performance than OFDM
5. [_] Multiple antennas consume more power (than SISO)