EXAM 2

1) True/ False **(10 POINTS)**

a- Each LAN adapter (network card) has a unique LAN address. T

b- Consider a network consisting of several interconnected 10 BaseT hubs, but which does not include any bridges or routers. Then this network has only 1 collision domain. T

c- The time it takes for a bit to propagate from hub to node for a 10BaseT Ethernet is ten times longer then for a 100BaseT Ethernet. F

d- All link layer protocols have the same frame structure. F

e) A repeater boosts the signal power and extends a LAN effective length. F

2) Multiple choice: **(16 POINTS)**

For Ethernet, if a station determines that a frame it has just received is addressed to a different station:

- It discards the frame and sends an error message to the network layer.
- It sends a NAK frame to the sending station.
- (•) It discards the frame without sending any error message.

In Ethernet, suppose a node constructs a frame and then senses the channel as busy. Then

- The node begins to transmit the frame
- (•) The node waits until it senses the channel idle and then begins its transmission
- (•) The node waits a random time and then transmit the frame

A 10BaseT Ethernet LAN has

- A ring topology
- (•) A bus topology
- (•) A star topology

A channel partitioning protocol has which of the following characteristics:

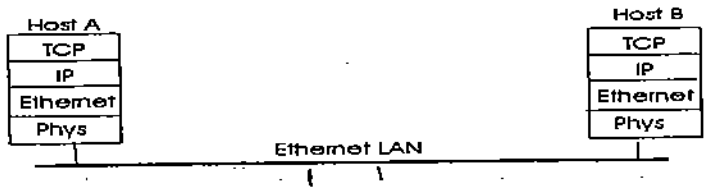
- All transmitting nodes get the same amount of bandwidth
- (•) It does not generate collisions
- (•) All of the above

3) IDLE RQ (STOP AND WAIT) **(14 POINTS)**

A channel has a data rate of 4 Kbit/s and a propagation delay of 20 ms. For which frame size does "stop and wait" give an utilisation of at least 50% ?

4) Fragmentation **(14 POINTS)**

In the network shown below, 2800 Bytes of data are delivered from an application on Host A to its transport layer. Assume a TCP header and an IP header of 20 Bytes each. Also assume that the Ethernet header is 14 Bytes and the Ethernet trailer is 4 Bytes. How many frames are transferred over the Ethernet LAN if the maximum data packet size on the LAN is 1518 Bytes? Describe the structure of these frames.



5) Frame size **(16 POINTS)**

Determine the size of the frames used in a token ring LAN in order to have a normalized throughput of 0.3. Assume the bit rate is 10 Mbps, the velocity of propagation is equal to 2×10^8 ms^{-1} and the transmission medium is a ring of 20 Km.

6) Message Rate **(12 POINTS)**

How many messages per second can an 10 Mbps Ethernet LAN handles if it has a normalized throughput of 0.25 and the messages are 70 characters long.

7) Routing in Ethernet **(18 POINTS)**

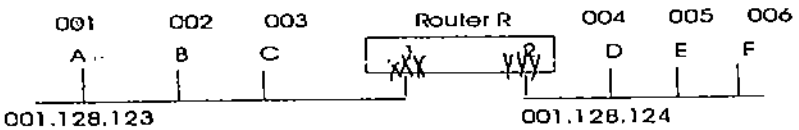
Consider the following network consisting of two three-station Ethernets segments attached via an IP router. Hosts A through F have Ethernet addresses of aaa, bbb, ccc, ddd, eee, and fff respectively. Router Port 1 has MAC address xxx, port 2 has MAC address yyy. The host id is shown above each host, the netid below the Ethernet.

a) Give the ARP (address resolution protocol) cache for station *C* assuming that *C* has recently communicated with all other stations.

IP	MAC
1.128.123	aaa
2	bbb
3	~~ccc~~
4.5.6	xxx

b) Give the routing table for the router.

c) If *A* sends *D* a packet, explain what takes place and sketch the packet.



Router

1.128.123	xxx
1.128.124	yyy

A sends to the router and the router sends it to D.

~~1.128.123~~ Dest IP, Source IP, Dest MAC, Source MAC