(5 pts) In addition to writing your name above, also write it on the BACK of this sheet.

1. (10 points) In 2-3 sentences, describe why circuit switching is not well suited for data communication and why packet switching is better suited for data communication.

Key points in bold, but as long as the basic idea is presented, give full credit.
Circuit switching is a connection-oriented form of communication that reserves capacity along a connection between communicating nodes. However, data communication is bursty, so much of the reserved capacity will be wasted. Moreover, once all the channels on a link have been reserved, subsequent call attempts will be blocked, limiting sharing. In packet switching, the data is divided into packets that are transmitted across the network independently. Each packet contains a full destination address, which is used by a routing algorithm at each node to direct the packet, hop-by-hop, across the network toward the destination node. With packet switching, channel capacity (bandwidth) is allocated dynamically to packets, rather than reserved in advance. By allocating bandwidth dynamically, packet switching is more efficient than circuit switching for transmitting data and enables a higher degree of sharing among multiple data streams. A disadvantage of packet switching is that packets can queue at intermediate nodes, delaying their delivery.

2. (5 points) List the layers of the Internet protocol stack that execute on hosts.

All 5 layers (they need to be listed): Application, Transport, Network, Link, Physical
If they list specific protocols, e.g. TCP, IP, they can have credit, but mark the correct solution on their paper.

3. (10 points) Consider a frame sent as part of an browser session (using the HTTP protocol) between two computers connected by an 802.11 wireless local area network. The application-level message (referred to as data payload) will be augmented with headers and trailers as it proceeds down the Internet protocol stack. The application protocol is HTTP. The transport protocol is TCP. The network protocol is IP. The link protocol is 802.11. In the picture below, identify and label the relative locations of the following six parts of the frame: data payload, TCP header, 802.11 header, 802.11 trailer (checksum), HTTP header, IP header.

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FRAME

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Diagram of the frame with the following labels:
- **802.11**: Bottom left corner
- **DATA PAYLOAD**: In the middle
- **TCP**: Above the payload
- **HTTP**: Above TCP
- **IP**: Above HTTP
- **802.11**: Bottom right corner

Direction of transmission is from left to right.