OSI and TCP Layered Models

ISO/OSI

#	Layer	Function	PDU/Protocols	Hardware
7	Application	Provides services to the software through which the user requests network services	Data/HTTP, WWW, FTP,TELNET, SMTP	
6	Presentation	This layer is concerned with data representation and code formatting	Data/ASCII, EBCDIC, MIDI, MPEG, JPEG	
5	Session	Establishes, maintains, and manages the communication session between computer.	Data/SQL, RPC	
4	Transport	Provides for the reliable transmission of data segments, as well as the disassembly and assembly of the data before and after transmission.	Segment/TCP or UDP	
3	Network	This is the layer on which routing takes place. The Network layer defines the processes used to route data across the network and the structure and use of logical addressing.	Packet/IP, ICMP, ARP, PING, Traceroute	Routers
2	Data Link	This layer is concerned with the linkages and mechanisms used to move data about the network, including the topology, such as Ethernet or Token Ring, and deals with the ways in which data is reliably transmitted. The data link layer is divided into two sub layers: The Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sub layer controls how a computer on the network gains access to the data and permission to transmit it The LLC layer controls frame synchronization, flow control and error checking.	Frame/IEEE 802.2, 802.3, 802.5	Network Interface Cards, Ethernet and Token Ring switches, Bridges
1	Physical	This layer defines the electrical and physical specifications for the networking media that carry the data bets across a network.	Bits/IEEE 802.3, 802.5, Fast Ethernet, RS232, ATM	Wires, Connector/Pin assignments, Network adapter, Repeater, Network hub, Modem, Wireless system components, Parallel SCSI, Fiber Media Converter, Network Interface Cards

TCP/IP

#	Layer	Function	PDU/Protocols	Hardware
4	Application	This layer is comparable to the application, presentation, and session layers of the OSI model all combined into one. It provides a way for applications to have access to networked services. This layer also contains the high level protocols.	Data/FTP, HTTP, SMTP, DNS, TFTP	
3	Transport	This layer acts as the delivery service used by the application layer.	Segment/TCP, UDP	
2	Internet	The routing and delivery of data is the responsibility of this layer and is the ley component of this architecture. It allows communication across networks of the same and different types and carries out translations to deal with dissimilar data addressing schemes.	Packet/IP, APR	Routers
1	Link, or Network Access	This a combination of the Data Link and Physical layers of the OSI model which consists of the actual hardware.	Bits/CMSA/CD, IBM, Token Passing, Frame Relay	Wires, network interface cards

Questions:

1. By OSI layers, which group sets the standards for each OSI layer?

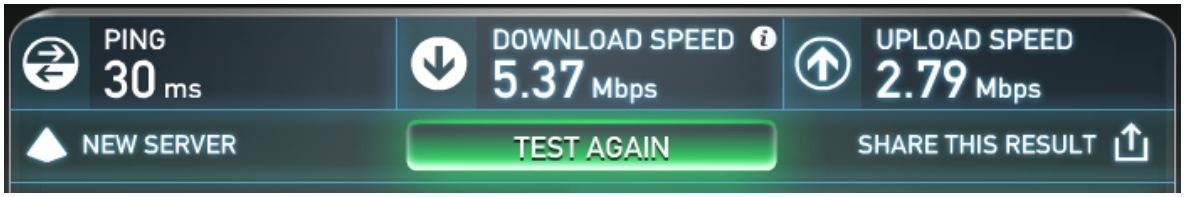
   Layer 1 – Physical Layer is set by groups like the ANSI, IEEE and the EIA/TIA
   Layer 2 – Data Link Layer is set by the IEEE and the EIA/TIA
   Layer 3 – Network Layer – IP the IETF
   Layer 4 – Transport Layer – TCP the ITEF
   Layer 5 – Session Layer - POP is an IETF standard, SQL is an ANSI Standard
   Layer 6 – Presentation Layer – MPEG - Moving Picture Coding Experts Group.
   Layer 7 – Application Layer – HTML for example is governed by IETF, but companies can add their own functionality. SMTP is governed by IETF.

2. Describe, by device, how information from your computer's keyboard at home gets out to the Internet. Specifically, briefly describe each device and its function.

   Keystrokes are input, sent from the keyboard to the CPU through a bus. The input goes into memory where an application like a browser can format and send the information to the Internet. Packets go to a network card are sent out over Ethernet cable to a router out to the ISP where they are routed to the destination website.

3. Go to speedtest.net and test your Internet connection speed. Report that on your assignment.

   My Internet service provider is Comcast cable.



Vocabulary Table

Term	Definition or Description
ANSI	American National Standards Institute is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.
Backbone Network	Part of computer network infrastructure that interconnects various pieces of network, providing a path for the exchange of information between different LANs or sub networks. A backbone can tie together diverse networks in the same building in different buildings in a campus environment, or over wide areas. Normally, the backbone's capacity is greater than the networks connected to it.
Broadband	Technical term that refers to a specific type of data transmission that is used by one of these circuits (e.g. DSL). However, its true technical meaning has become overwhelmed by its use in the popular press to refer to high- speed circuits in general. Therefore, we too will use it to refer to circuits with data speeds of 1 Mbps or higher.
Circuit	The path over which the voice, data, or image transmission travels. Circuits can be twisted-wire pairs, coaxial cables, fiber optic cables, microwave transmissions, and so forth. Compare with channel, line, and link.
Client	The input–output hardware device at the user's end of a communication circuit. There are three major categories of clients: computers, terminals, and special-purpose terminals.
Data Link Layer	The data link layer manages the physical transmission circuit in layer 1 and transforms it into a circuit that is free of transmission errors as far as layers above are concerned.
Extranet	Using the Internet to provide access to information intended for a selected set of users, not the public at large. Usually done by requiring a password to access a selected set of Web sites.
FCC	Federal Communications Commission A board of seven commissioners appointed by the U.S. president under the Communication Act of 1934, having the power to

	regulate all interstate and foreign electrical communication systems originating in the United States.
Firewall	A router, gateway, or special-purpose computer that filters packets flowing into and out of a network. No access to the organization's networks is permitted except through the firewall. Two commonly used types of firewalls are packet level and application level.
IEEE	Institute of Electrical and Electronics Engineers A professional organization for engineers in the United States. Issues standards and belongs to the ANSI and the ISO. IEEE has defined numerous standards for networks.
IETF	Internet Engineering Task Force IETF is a large, open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. IETF operates through a series of working groups, which are organized by topic (e.g., routing, transport, security). The requests for comment (RFCs) that form the basis for Internet standards are developed.
ITU	International Telecommunications Union—Telecommunications An international organization that sets worldwide communication standards. Its old name was Consultative Committee on International Telegraph and Telephone (CCITT).
Internet	The information superhighway. The network of networks that spans the world, linking more than 20 million users.
Intranet	Using Internet protocols on a network internal to an organization so that information is accessible using a browser, for example, but only by employees, not the public at large. Usually done by requiring a password to access a selected set of Web sites and protecting the site by a firewall so no outsiders can access it.
ISP	Internet Service Provider ISPs offer connections to the Internet. Some access providers charge a flat monthly fee for unlimited access (much like the telephone company), whereas others charge per hour of use (much like a long-distance telephone call).
KB	The kilobyte is a multiple of the unit byte for digital information. Although the SI prefix kilo- means 1000, the term kilobyte and symbol KB have historically been used to refer to either 1024 (2^{10}) bytes or 1000 (10^3) bytes.
Kb	The kilobit is a multiple of the unit bit for digital information. 1 kilobit = 10^3bits = 1000bits.
LAN	Local area network A network that is located in a small geographic area, such as an office, a building, a complex of buildings, or a campus, and whose communication technology provides a high-bandwidth, low-cost medium to which many nodes can

	be connected. These networks typically do not use common carrier circuits, and their circuits do not cross public thoroughfares or property owned by others. LANs are not regulated by the FCC or state public utilities commissions.
Logical	It describes the use of valid reasoning in some activity.
Modem	A contraction of the words modulator-demodulator. A modem is a device for performing necessary signal transformation between terminal devices and communication circuits. Modems are used in pairs, one at either end of the communication circuit.
Open System	Computer systems that provide some combination of interoperability, portability, and open software standards.
Physical	A 1981 album by Olivia Newton-John. Of or relating to things perceived through the senses as opposed to the mind; tangible or concrete.
RFC	Request for comment A proposed standard for the Internet on which anyone in the world is invited to comment.
Router	A device that connects two similar networks having the same network protocol. It also chooses the best route between two networks when there are multiple paths between them.
Client	The input–output hardware device at the user's end of a communication circuit. There are three major categories of clients: computers, terminals, and special-purpose terminals.
Switch	Switches connect more than two LAN segments that use the same data link and network protocol. They may connect the same or different types of cable. Switches typically provide ports for 4, 8, 16, or 32 separate LAN segments, and most enable all ports to be in use simultaneously, so they are faster than bridges.
VPN	Virtual private network A hybrid network that includes both public and private facilities. The user leases a bundle of circuits and configures the VPN on an as-needed basis so that some traffic travels on the private leased network and some travels on the common carrier's public network.
WAN	wide area network: A network spanning a large geographical area. Its nodes can span city, state, or national boundaries. WANs typically use circuits provided by common carriers.
Wireless Access Point	A device that allows wireless devices to connect to a wired network using Wi-Fi, or related standards. The AP usually connects to a router (via a wired network) as a standalone device, but it can also be an integral component of the router itself.