



Subject Code: 17533      Model Answer

**Important Instructions to examiners:**

- 1) The answers should be examined by key words and not as word-to-word as given in the answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



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1. a) Attempt any three of the following: 12

i) List any two features of PCI-Xpress. Give two differences between PCI-X & PCI-Xpress.

Ans: (2M-features,2M-difference ( any two each)

**Features:**

1. High performance
2. I/O Simplification, It utilizes individual buses for each of the devices connected to it instead of a shared one like what PCI uses.
3. PCI-Xpress uses a serial interface instead of the old parallel interface used by PCI.
4. Layered Architecture, PCI-Xpress speed is classified into lanes, each capable of delivering up to 1GB/s data transfer. Thus it can send or receive up to 16GB/s.
5. Isochronous data transfers: The image and audio data is transferred at a constant rate ie through synchronous link.
6. Ease of use.

**Differences:**

Sr. No	PCI-X	PCI-Xpress
1	PCI-X uses a parallel interconnect along a bus that is shared with other PCI-X devices	PCI-Express, on the other hand, uses a serial interconnect along a switched bus dedicated exclusively to that slot.
2	The bus is 64-bits wide, and runs at higher frequencies (now up to 533MHz, compared to 66MHz).The maximum transfer rate is up to 34Gbps (4GB/s).	It runs at 2.5 GHz , the data rate stream is encoded using the 8-bit /10bit scheme. The maximum transfer rate is 16GB/s in two directions.
3	It does not have lane structure so bandwidth is less as compared to PCI-Xpress.	PCI-Express has the unique capability of multiplying up individual data "lanes", to produce aggregate interconnects that can deliver up to 16 times the bandwidth of a single lane.
4	It is backward compatible.	It is not backward compatible.

ii) Describe the importance of preventive maintenance.

Ans: (4M- Explanation (Any correct relevant points should be given marks))

**Importance of Preventive Maintenance**

Preventive maintenance is one of the most ignored aspects of PC ownership, most people seem to think that the PC doesn't need preventive maintenance, and so you should just use it until it breaks, and then repair or replace it. Some reasons why there should be a preventive maintenance plan for PC:

- Preventive Maintenance Saves Money: Avoiding problems with your PC will save you money in the long run, compared with laying out cash for new components or repair jobs.
- Preventive Maintenance Saves Time: Because it saves you the much bigger hassles of dealing with system failures and data loss. Most preventive maintenance procedures are quite simple compared to troubleshooting and repair procedures.
- Preventive Maintenance Helps Safeguard Your Data: The data on the hard disk is more important than the hardware that houses it. Taking steps to protect this data therefore makes sense, and that is what Preventive maintenance is all about.



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- Preventive Maintenance Improves Performance: Some parts of system will actually degrade in performance over time, and preventive maintenance will help to improve the speed of your system in these respects.

iii) State any four characteristics of LCD monitor.

Ans: (1M-each(any 4))

Characteristics of LCD Monitor

1. Pixels: This refers to an individual dot on the screen. All graphics displayed on the screen are composed of hundreds or thousands of these graphic dots or pixels or pet. It can be of different color thus producing the images.
2. Resolution: A monitor resolution describes the no of potential pixels the monitor is capable of displaying. The value is given in horizontal & vertical pixels
3. Dot Pitch: It determines the sharpness of the display. In LCDs display technologies, dot pitch refers to the distance between sub pixels of the same color in pixel triads.
4. Aspect ratio: The width to height ratio of an image or computer screen is known as the aspect ratio. It is important in preventing distortion when an image is resized or incorporated into software. OR The aspect ratio of a display is the proportional relationship between its width and its height.
5. Brightness: Brightness refers to the emitted luminous intensity on screen and is measured in candela per square meter (cd/m<sup>2</sup> or nits). A higher cd/m<sup>2</sup> or nit value means higher onscreen brightness.
6. Contrast ratio: Contrast ratio is the ratio between the whitest white and the blackest black that can be produced. It is expressed in the form of 400:1, for example.
7. Viewable size: Screen size is measured diagonally from the inside of the beveled edge. The measurement does not include the casing.
8. Response time: It measures the time that it takes for a pixel to go from black to peak intensity white and then back to black again.

iv) Define MAN. Give any two differences between LAN and WAN.

Ans: (2M-definition,2M- difference(any 2 points))

Short for Metropolitan Area Network, a data network designed for a town or city. In terms of geographic breadth, MANs are larger than local-area networks (LANs), but smaller than wide-area networks (WANs). MANs are usually characterized by very high-speed connections using fiber optical cable or other digital media.

Parameters	LAN	WAN
<b>Stands For</b>	Local Area Network	Wide Area Network
<b>Covers</b>	Local areas only (e.g., homes, offices, schools)	Large geographic areas (e.g., cities, states, nations)
<b>Definition</b>	LAN (Local Area Network) is a computer network covering a small geographic area, like a home, office, school, or group of buildings.	WAN (Wide Area Network) is a computer network that covers a broad area (e.g., any network whose communications links cross metropolitan, regional, or national boundaries over a long distance).
<b>Speed</b>	High speed (1000 mbps)	Less speed (150 mbps)

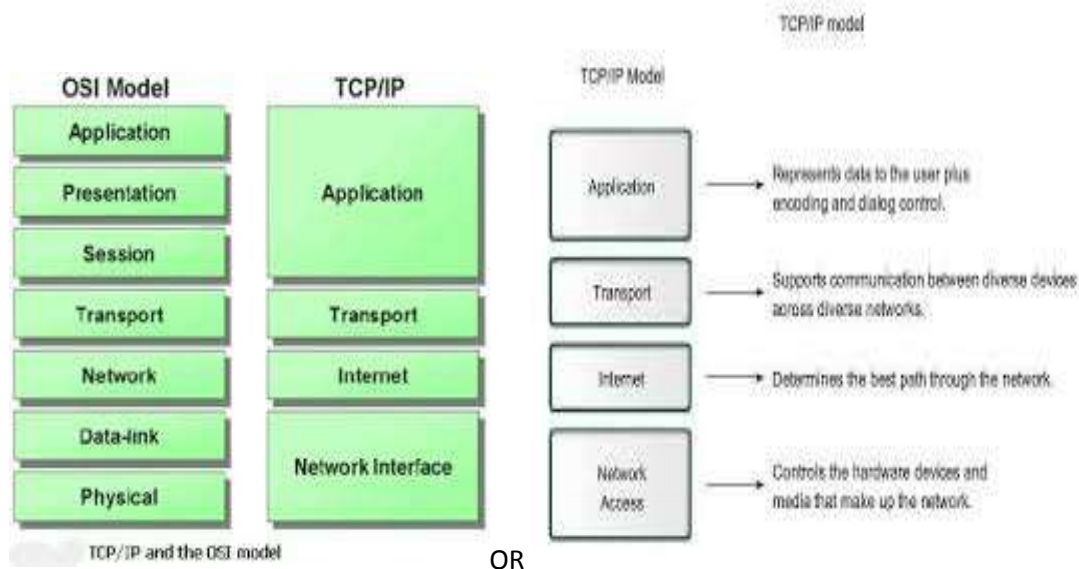
<b>Data transfer rates</b>	LANs have a high data transfer rate.	WANs have a lower data transfer rate compared to LANs.
<b>Example</b>	The network in an office building can be a LAN	The Internet is a good example of a WAN
<b>Technology</b>	Tend to use certain connectivity technologies, primarily Ethernet and Token Ring	WANs tend to use technologies like MPLS, ATM, Frame Relay and X.25 for connectivity over longer distances
<b>Connection</b>	One LAN can be connected to other LANs over any distance via telephone lines and radio waves.	Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites.

b) Attempt any one of the following:

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i) Draw TCP/IP reference model and give the function of each layer.

Ans: (2M- diagram, 4M- explanation(1M-each layer))



As we can see from the above figure, presentation and session layers are not there in TCP/IP model.

Also note that the Network Access Layer in TCP/IP model combines the functions of Data link Layer and Physical Layer.

#### Layer 4. Application Layer

Application layer is the top most layer of four layer TCP/IP model. Application layer is present on the top of the Transport layer. Application layer defines TCP/IP application protocols and how host programs interface with Transport layer services to use the network.

Application layer includes all the higher-level protocols like DNS (Domain Naming System), HTTP (Hypertext Transfer Protocol), Telnet, SSH, FTP (File Transfer Protocol), TFTP (Trivial File Transfer Protocol), SNMP (Simple Network Management Protocol), SMTP (Simple Mail Transfer Protocol), DHCP (Dynamic Host Configuration Protocol), X Windows, RDP (Remote Desktop Protocol) etc.

#### Layer 3. Transport Layer

Transport Layer is the third layer of the four layer TCP/IP model. The position of the Transport layer is between Application layer and Internet layer. The purpose of Transport layer is to permit devices on

the source and destination hosts to carry on a conversation. Transport layer defines the level of service and status of the connection used when transporting data.

The main protocols included at Transport layer are TCP (Transmission Control Protocol) and UDP (User Datagram Protocol).

### Layer 2. Internet Layer

Internet Layer is the second layer of the four layer TCP/IP model. The position of Internet layer is between Network Access Layer and Transport layer. Internet layer pack data into data packets known as IP datagrams, which contain source and destination address (logical address or IP address) information that is used to forward the datagrams between hosts and across networks. The Internet layer is also responsible for routing of IP datagrams.

Packet switching network depends upon a connectionless internetwork layer. This layer is known as Internet layer. Its job is to allow hosts to insert packets into any network and have them to deliver independently to the destination. At the destination side data packets may appear in a different order than they were sent. It is the job of the higher layers to rearrange them in order to deliver them to proper network applications operating at the Application layer.

The main protocols included at Internet layer are IP (Internet Protocol), ICMP (Internet Control Message Protocol), ARP (Address Resolution Protocol), RARP (Reverse Address Resolution Protocol) and IGMP (Internet Group Management Protocol).

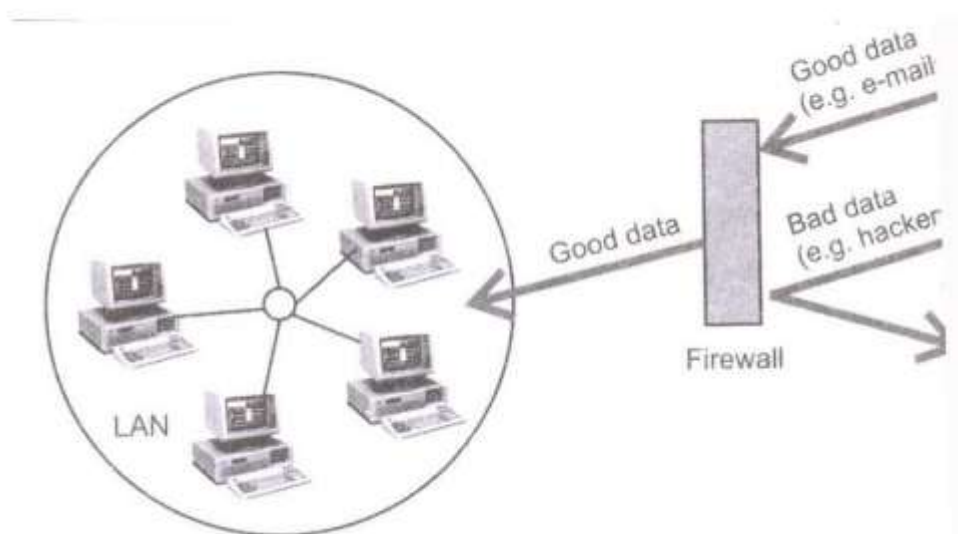
### Layer 1. Network Access Layer

Network Access Layer is the first layer of the four layer TCP/IP model. Network Access Layer defines details of how data is physically sent through the network, including how bits are electrically or optically signaled by hardware devices that interface directly with a network medium, such as coaxial cable, optical fiber, or twisted pair copper wire.

The protocols included in Network Access Layer are Ethernet, Token Ring, FDDI, X.25, Frame Relay etc.

ii) Describe the function and operation of firewall with neat diagram.

Ans: (2M- diagram, 4M- explanation)



A firewall is a part of computer system or network that is designed to block unauthorized access while permitting authorized communications.

2. It is a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy



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all (in and out) computer traffic between different security domain based upon a set rules and other criteria.

3. Firewalls can be implemented in either hardware or software, or a combination of both. Firewalls are frequently used to prevent unauthorized internet users from accessing private networks connected to the internet, especially intranets.

4. All messages entering or leaving the intranet pass through the firewall, which examines each messages and block those that do not meet the specified security criteria.

5. A firewall blocks unauthorized connections being made to your computer or LAN,, normal data is allowed through the firewall but all other data is blocked.

There are several types of firewall techniques:

- i. Packet filter
- ii. Proxy server
- iii. Circuit-level Gateway
- iv. Application Gateway

2. Attempt any FOUR of the following:

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a) Compare CRT and LCD display. (four points)

Ans: ( 4M- each point(any four correct points should be given marks))

Characteristics	LCD Displays	CRT Monitors
Brightness	Produces very bright images due to high peak intensity. Very suitable for environments that are brightly lit .	Fairly bright, but not as bright as LCDs. Not appropriate for brightly lit conditions.
Emissions	Produce considerably lower electric, magnetic and electromagnetic fields than CRTs.	Gives off electric, magnetic and electromagnetic fields.
Geometric Distortion	No geometric distortion at the native resolution. Minor distortion can occur for other resolutions.	Vulnerable to geometric distortion, but most CRTs feature user controls to decrease or eliminate the distortion.
Power Consumption	Energy efficient. Consume less than 1/3 the power of a comparable CRT. Consume less electricity than a CRT and produce little heat.	Use more power and produce more heat than a comparable LCD.
Physical Aspects	Take up about 40% less desk space. LCDs are thin and compact.	Larger, weigh more and take up more space than an LCD.
Screen Shape	Completely flat screen.	Older CRTs have a rounded spherical or cylindrical shape screen whereas newer CRTs have a flat screen.
Sharpness	At the native resolution, the image is perfectly sharp. Adjustments are required at all other resolutions which	Normally sharper than LCDs (except when the LCD is at it's native resolution). Sharpness can be reduced



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	can result in measurable degradation to the image.	by images with softer edges, flawed focus and color registration.
Bad Pixels	Can have many weak or stuck pixels, which are permanently on or off. Some pixels may be improperly connected to adjoining pixels, rows or columns.	In rare instances 1 or 2 dark phosphor dots, which are hard to detect. Aperture grille tubes generally have 2 very thin wires that are sometimes noticeable. Bothers some people but most don't notice.
Interference	May require frequent readjustments throughout the day due to timing drift and jitter. Analog input requires careful modification of pixel tracking / phase to decrease or eliminate digital noise in the image.	Produces irritating Moiré patterns. (Most CRTs include Moiré reduction, but this does not eliminate the Moiré interference patterns completely.)
Aspect Ratio	The aspect ratio and resolution are fixed.	Easily duplicates any preferred aspect ratio.
Black-Level	Not proficient at producing black and very dark grays. Not appropriate for use in dimly lit and dark conditions.	Appropriate for use in conditions that are dimly lit and dark. Produce a very dark black.
Contrast	Lower contrast than CRTs due to a poor black-level.	Produce the highest contrast levels commonly available.
Color and Gray-Scale Accuracy	Color saturation is reduced at low intensity levels due to a poor black-level. Images are satisfactory, but not accurate due to problems with black-level, gray-scale and Gamma.	Completely smooth gray-scale and an unlimited number of intensity levels. Best for applications that require a very accurate color and gray-scale calibration.
Cost	Considerably more expensive purchase price than comparable CRTs . (Cheaper lifetime cost: lasts about 13,000 - 15,000 more hours than a typical CRT.)	Less expensive than comparable displays using other display technologies. CRTs can save you more than 50% on the purchase price.
Gray-Scale	Have an irregular intensity scale and typically produce fewer than 256 discrete intensity levels. For some LCDs portions of the gray-scale may be dithered.	Perfectly smooth gray-scale with an infinite number of intensity levels.
Motion Artifacts	Slow response times and scan rate conversion result in severe motion artifacts and image degradation for moving or rapidly changing images.	Fast response times and no motion artifacts. Works best for rapidly moving or changing images.
Resolution	Works best at the native resolution. The native resolution can not be	Operate at the highest pixel resolutions generally available. Will





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	changed. All other resolutions require adjusting procedures which can cause considerable deterioration of the image.	operate at any resolution, geometry and aspect ratio without having to adjust the image.
Viewing Angle	Restricted viewing angles. Viewing angles affect the brightness, contrast and colors shown. Wide angles can lead to contrast and color reversal.	Viewable from almost every angle.

- b) State any two problems related to hard disk with their symptoms. Discuss preventive maintenance for hard disk.

Ans: (1M- problems,3M- explanation)

Any two problems related to Hard disk

1. System is not booting from Hard disk drive.
2. Disk performance is low.
3. System displays "No fixed disk present " Error message on the monitor.
4. Scan disk incorrectly reports Hard disk problem under Windows.

**Preventive maintenance of HDD**

The preventive maintenance tasks for the hard drive deal more with optimising its storage than with physical cleaning tasks. You have no cleaning tasks to perform, because the hard drive is a sealed unit. The preventive maintenance tasks for a hard drive involve the following:

Back-up the data

Run diagnostics like Scandisk and manufacturers' diagnostic tools.

Defragment the drive; Disk Defragmenter can be found by right clicking the drive in Windows Explorer and selecting Properties, then Tools.

- c) Describe various factors considered for passive maintenance.

Ans: (1M –each factor, any other relevant factor should be given marks)

1. Static Electricity: Static electricity or ESD can cause numerous problems within a system. The problems usually appear during the winter months when humidity is low or in extremely dry climates where the humidity is low year-round.
2. Power-Line Noise: To run properly, a computer system requires a steady supply of clean, noise-free power.
3. Radio-Frequency Interference : Radio-frequency interference (RFI) is easily overlooked as a problem factor. The interference is caused by any source of radio transmissions near a computer system.
4. Dust and Pollutants : Dirt, smoke, dust, and other pollutants are bad for your system. The power-supply fan carries airborne particles through your system, and they collect inside.

- d) Describe the need and importance of subnet masking. Give an example of subnet mask.

Ans: (2M-Explanation, 2M-example)

Subnet mask is a 32 bits long address used to distinguish between network address and host address in IP address. Subnet mask is always used with IP address. Subnet mask has only one





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purpose, to identify which part of an IP address is network address and which part is host address.

With subnetting, IP addresses use a 3-layer hierarchy:

Network

Subnet

Host

Improves efficiency of IP addresses by not consuming an entire address space for each physical network. Reduces router complexity. Since external routers do not know about subnetting, the complexity of routing tables at external routers is reduced.

Note: Length of the subnet mask need not be identical at all subnetworks.

For example how will we figure out network partition and host partition from IP address 192.168.1.10 ? Here we need subnet mask to get details about network address and host address.

In decimal notation subnet mask value 1 to 255 represent network address and value 0 [Zero] represent host address.

In binary notation subnet mask on bit [ 1 ] represent network address while off bit[0] represent host address.

In decimal notation

IP address 192.168.1.10

Subnet mask 255.255.255.0

Network address is 192.168.1 and host address is 10.

In binary notation

IP address 11000000.10101000.00000001.00001010

Subnet mask 11111111.11111111.11111111.00000000

Network address is 11000000.10101000.00000001 and host address is 00001010

e) State the various basic and advanced properties configured for TCP/IP.

Ans: (4M- explanation)

You can use this procedure to configure the TCP/IP settings for each of your network connections.

Each connection can be configured to use IPv4 or IPv6, or both.

## To configure TCP/IPv4

1. [Open the Network Connections folder and view available connections.](#)
2. Right-click the connection that you want to configure, and then click **Properties**.
3. Do one of the following:
  - If the connection is a local area connection, on the **General** tab, in **This connection uses the following items**, click **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.
  - If the connection is a dial-up, VPN, or broadband connection, on the **Networking** tab, in **This connection uses the following items**, click **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.
  - If the connection is an incoming connection, see [Configure an Incoming Connection to use TCP/IP](#).
4. Do one of the following:
  - If you want IP settings to be assigned automatically by a DHCP server, VPN server, or other device that provides DHCP services that is installed on the network to which you're connecting, click **Obtain an IP address automatically**, and then click **OK**.

- o If you want to specify an IPv4 address or a Domain Name Service (DNS) server address, do the following:

Click **Use the following IP address**, and then in **IP address**, type the IP address, and an appropriate subnet mask and default gateway address.

Click **Use the following DNS server addresses**, and then in **Preferred DNS server** and **Alternate DNS server**, type the addresses of the primary and secondary DNS servers.

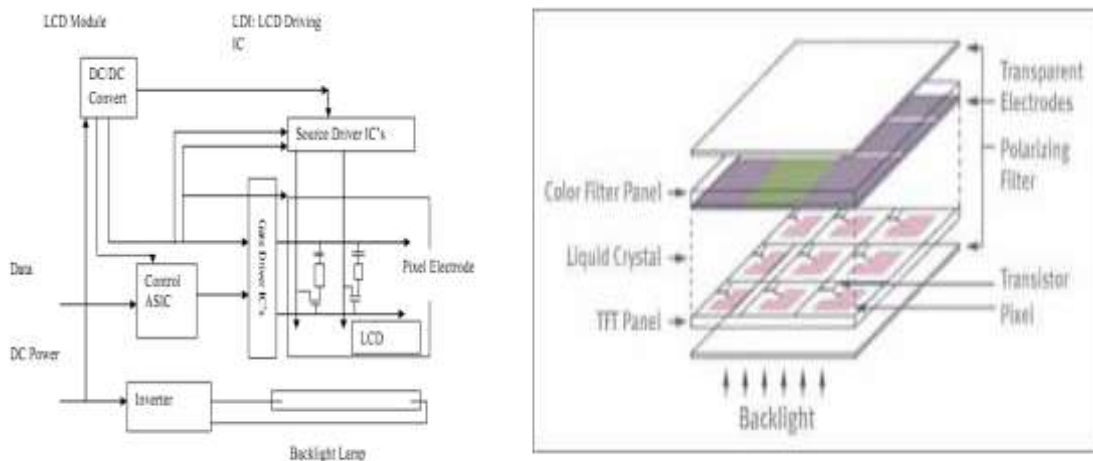
5. To configure DNS, Windows Internet Name Service (WINS), and IP settings, click **Advanced**.
6. On a local area connection, selecting the **Obtain an IP address automatically** option enables the **Alternate Configuration** tab. Use this to enter alternate IP settings if your computer is used on more than one network. To configure DNS, WINS, and IP settings, click **User configured** on the **Alternate Configuration** tab.

3. Attempt any two of the following:

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- a) Draw and explain functional block diagram of LCD monitor.

Ans: (Block diagram – 4m; working – 4m)( Any one diagram can be drawn)



**Backlight:** The amount of light supplied by Back Light is determined by the amount of movement of the liquid crystals in such a way as to generate color.

**Driving Circuit Unit**

Driving an a-Si TFT LCD (Thin Film Transistor Liquid Crystal Display) requires a driving circuit unit consisting of a set of LCD driving IC (LDI) chips and printed-circuit-boards (PCBs).

**LCD Panel:**

A TFT LCD panel contains a specific number of unit pixels often called subpixels. Each unit pixel has a TFT, a pixel electrode (ITO), and a storage capacitor (Cs).

**Generation of colors:**

The color filter of a TFT LCD TV consists of three primary colors - red (R), green (G), and blue (B) - which are included on the color-filter substrate. The elements of this color filter line up one-to-one with the unit pixels on the TFT-array substrate. Each pixel in a color LCD is subdivided into three subpixels, where one set of RGB subpixels

is equal to one pixel

b) Draw pin diagram of ATX power supply. Give the function of each pin.

Ans : (6M- diagram, 2M-explanation)

24-pin ATX12V 2.x power supply connector

(20-pin ATX connector omits the last four pins – 11, 12, 23 and 24)



**Four wires have special functions:**

PS\_ON or power on is a signal from the motherboard to the power supply. When the line is connected to ground (by the motherboard), the power supply turns on. It is internally pulled up to +5 V inside the power supply.]

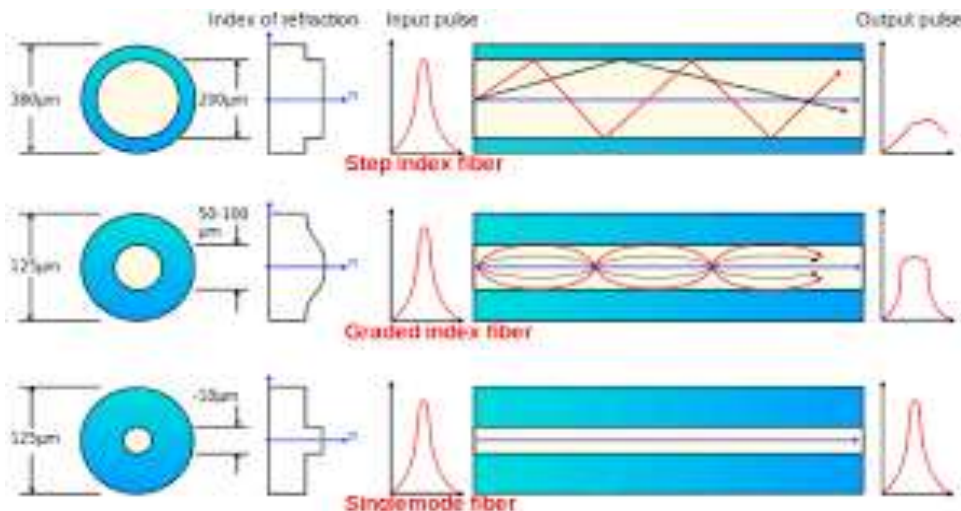
PWR\_OK (a "power good" signal) is an output from the power supply that indicates that its output has stabilized and is ready for use. It remains low for a brief time (100–500 ms) after the PS\_ON signal is pulled low.

+5 VSB or +5 V standby supplies power even when the rest of the supply lines are off. This can be used to power the circuitry that controls the Power On signal.

+3.3 V sense should be connected to the +3.3 V on the motherboard or its power connector. This connection allows for remote sensing of the voltage drop in the power supply wiring.

c) Describe the different modes of fibre optic cable with neat diagram. Compare fibre optic cable with UTP cable.

Ans: (2M-diagram,2M-explanation,4M-comparison(any correct 4 points should be given marks))





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STEP-INDEX MULTIMODE FIBER has a large core, up to 100 microns in diameter. As a result, some of the light rays that make up the digital pulse may travel a direct route, whereas others zigzag as they bounce off the cladding. These alternative pathways cause the different groupings of light rays, referred to as modes, to arrive separately at a receiving point. The pulse, an aggregate of different modes, begins to spread out, losing its well-defined shape. The need to leave spacing between pulses to prevent overlapping limits bandwidth that is, the amount of information that can be sent. Consequently, this type of fiber is best suited for transmission over short distances, in an endoscope, for instance.

GRADED-INDEX MULTIMODE FIBER contains a core in which the refractive index diminishes gradually from the center axis out toward the cladding. The higher refractive index at the center makes the light rays moving down the axis advance more slowly than those near the cladding. Also, rather than zigzagging off the cladding, light in the core curves helically because of the graded index, reducing its travel distance. The shortened path and the higher speed allow light at the periphery to arrive at a receiver at about the same time as the slow but straight rays in the core axis. The result: a digital pulse suffers less dispersion.

SINGLE-MODE FIBER has a narrow core (eight microns or less), and the index of refraction between the core and the cladding changes less than it does for multimode fibers. Light thus travels parallel to the axis, creating little pulse dispersion. Telephone and cable television networks install millions of kilometers of this fiber every year.

Parameters	UTP	Fiber optic cable
Transmission rate	It has low transmission rates	It has high transmission rates
Ease of installation	It is easy to install as compared to fiber cables.	It does take a bit longer to terminate fiber than copper.
Security	It can be easily eavesdrop.	It is very secured.
Cost	UTP is cheaper as compared to fiber optic cables.	Fiber is more expensive than copper due to the light emitting equipment and cost.