



MODEL ANSWER

SUMMER - 2017 EXAMINATION

Subject: Computer Hardware & Networking

Subject Code: 17533

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model 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 judgement 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.

Q.No	Sub Q.N	Answer	Marking Scheme
1.	a) (i) Ans	Attempt any <u>THREE</u> of the following: Draw neat block diagram of flat bed scanner and explain its working. Working of flat bed scanner: A flat bed scanner uses a light source, a lens, a charge coupled device(CCD) array and one or more ADCs to collect the optical information about the object to be scanned and transforms it to a computer image file. <ul style="list-style-type: none">• A CCD is a miniature photometer that measures incident light and converts that measured value to an analog voltage.• A CCD element is all in one row with one element for each pixel in a line.• The following steps are involved in scanning a document:<ul style="list-style-type: none">○ A light source illuminates a piece of paper placed face down against a glass window above the scanning mechanism.○ A stepper motor moves the scan head beneath the page. As it moves, the scan head captures light reflected from individual areas of the page.	12 4M 2M for working flat bed scanner



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	<ul style="list-style-type: none"> ○ The light from the page is reflected through a system of mirrors. A lens focuses the beams of light onto light-sensitive diodes that translate the amount of light into electrical current. ○ The more light that's reflected, the greater the voltage. White spaces reflect more light than black or colored letters or images. ○ An ADC converts each analog reading of voltage as digital pixel representing, black or white. ○ ADC on monochrome scanner stores only 1 bit per pixel, either on or off. ○ If the scanner is color scanner then the scan head makes three passes under the images and light on each pass is directed through a red, green or blue filter before it strikes the original image. ○ The digital information is sent to software in the PC, where the data is stored in a format with which graphics program. <div style="text-align: center; margin-top: 20px;"> </div>	<p>2M for block diagram</p>																												
<p>(ii) Ans</p>	<p>Compare LAN, WAN and MAN.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="text-align: left;">Parameters</th> <th>LAN</th> <th>MAN</th> <th>WAN</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Cost</td> <td>Low</td> <td>High</td> <td>Higher</td> </tr> <tr> <td style="text-align: left;">Physical Area</td> <td>One building</td> <td>Within city</td> <td>World wide</td> </tr> <tr> <td style="text-align: left;">Installation Cost</td> <td>Less</td> <td>Medium</td> <td>Large</td> </tr> <tr> <td style="text-align: left;">Bandwidth</td> <td>High</td> <td>Medium</td> <td>Low</td> </tr> <tr> <td style="text-align: left;">Error correction</td> <td>Easy</td> <td>Difficult</td> <td>Very difficult</td> </tr> <tr> <td style="text-align: left;">Network Size</td> <td>Small</td> <td>Large</td> <td>Largest</td> </tr> </tbody> </table>	Parameters	LAN	MAN	WAN	Cost	Low	High	Higher	Physical Area	One building	Within city	World wide	Installation Cost	Less	Medium	Large	Bandwidth	High	Medium	Low	Error correction	Easy	Difficult	Very difficult	Network Size	Small	Large	Largest	<p style="text-align: center;">4M</p> <p style="text-align: center;"><i>Any four points 1M each</i></p>
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		Speed	Fastest	Slower	Slowest	
		Transmission media	Twisted pair	Twisted pair and fiber-optic cable	Fiber-optic, radio wave and satellite	
		No of computers	Less	Large	Largest	
		Protocol used	Ethernet, Token Ring, FDDI	ATM, FDDI,	Leased lines, serial links, ISDN, X.25	
		Advantage	Speed	Speed and distance	Distance	
		Common uses	File sharing	File sharing and file transfer	Email and file transfer	
	<p>(iii) Ans .</p>	<p>Describe data encapsulation.</p> <p>The Application layer is where the user interface exists, here the user interacts with the application, then this data is passed to the Presentation layer and then to the Session layer. These three layer add some extra information to the original data that came from the user and then passes it to the Transport layer. Here the data is broken into smaller pieces (one piece at a time transmitted) and the TCP header is added. At this point, the data at the Transport layer is called a segment.</p> <p>Each segment is sequenced so the data stream can be put back together on the receiving side exactly as transmitted. Each segment is then handed to the Network layer for network addressing (logical addressing) and routing through the internet network. At the Network layer, we call the data (which includes at this point the transport header and the upper layer information) a packet.</p> <p>The Network layer add its IP header and then sends it off to the Data link layer. Here we call the data (which includes the Network layer header, Transport layer header and upper layer information) a frame. The Data link layer is responsible for taking packets from the Network layer and placing them on the network medium (cable). The Data link layer encapsulates each packet in a frame which contains the hardware address (MAC) of the source and destination computer (host) and the LLC information which identifies to which protocol in the previous layer (Network layer) the packet should be passed when it arrives to its destination. Also,</p>				<p>4M</p> <p><i>Description</i></p> <p>2M</p>



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			<p><i>Diagram 2M</i></p>
		<p>at the end, you will notice the FCS field which is the Frame Check Sequence. This is used for error checking and is also added at the end by the Datalink layer.</p> <p>If the destination computer is on a remote network, then the frame is sent to the router or gateway to be routed to the destination. To put this frame on the network, it must be put into a digital signal. Since a frame is really a logical group of 1's and 0's, the Physical layer is responsible for encapsulating these digits into a digital signal which is read by devices on the same local network.</p> <p>There are also a few 1's and 0's put at the beginning of the frame, only so the receiving end can synchronize with the digital signal it will be receiving.</p>	
(iv) Ans	<p>Define cache memory. Explain different level of cache memory.</p> <p>Definition of cache memory:</p> <p>A cache memory is a fast local memory used as a buffer for a more distant, larger and slower memory in order to improve the average memory access speed.</p>	<p style="text-align: right;">4M</p> <p style="text-align: right;"><i>Definition 1M</i></p> <p style="text-align: right;"><i>Diagram 1M</i></p>	



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			<p><i>Levels of cache 2M</i></p>
		<p>Levels of Cache:</p> <ul style="list-style-type: none"> • Cache built into the CPU itself is referred as Level1 or L1 or Internal Cache. • Cache that resides on a separate chip next to the CPU is called Level2 or L2 or External Cache. • L1 is faster than L2 or any other external cache, running at the speed of the processor. • External cache is a separate high speed memory in between processor and main memory. • The cache controller always tries to make sure that the data required by the processor in the next memory access is available to the CPU without any wait state. 	
1.	<p>b) (i)</p> <p>Ans</p>	<p>Attempt any <u>ONE</u> of the following:</p> <p>What is preventive maintenance? Give its importance. Explain different type of preventive maintenance.</p> <p>Preventive maintenance :</p> <ul style="list-style-type: none"> • Preventive maintenance or periodic maintenance is must for obtaining long years of trouble free service from the PC. • It can reduce problem behavior, data loss and component failure and ensures long life for the system. <p>Importance of preventive maintenance:</p> <ul style="list-style-type: none"> • It can also increase your system's resale value as the system looks and runs better. 	<p>6 6M</p> <p><i>Preventive maintenance 2M</i></p> <p><i>Importance 1M</i></p>



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	<p style="text-align: center;">Repairs/Maintenance of PC</p> <pre>graph TD; Root[Repairs/Maintenance of PC] --> PM[Preventive Maintenance (P.M.) or Periodic Maintenance]; Root --> RM[Remedial Maintenance or Corrective Maintenance]; PM --> APM[Active P.M. (Related to PC components)]; PM --> PPM[Passive P.M. (Related to Environmental factor)]; RM --> OS[On-site or field or Card-level maintenance (user end)]; RM --> IH[In-House or component level maintenance (Workshop)];</pre> <p>Type of preventive maintenance:</p> <p>1) Passive preventive maintenance</p> <p>It includes periodic care of external factor which affect working of the PC i.e. Mainly providing the best possible physical and electrical environment for the PC to operate. Physical environment concerns with conditions:</p> <ol style="list-style-type: none">1. Ambient Temperature.2. Thermal Stress for power cycling.3. Dust and smoke contamination.4. Disturbances such as shocks and vibrations. <p>2) Active preventive maintenance</p> <ul style="list-style-type: none">• It describes several procedures to clean and lubricate all the major components, cleaning all boards, connectors, contacts etc.• It also describes similar procedures for different peripheral devices such as HDD, FDD, keyboard, printer, monitor etc.• It includes performing backups, antivirus and antispyware scans.	<p><i>Types of preventive maintenance</i> <i>1^{1/2}M each</i></p>
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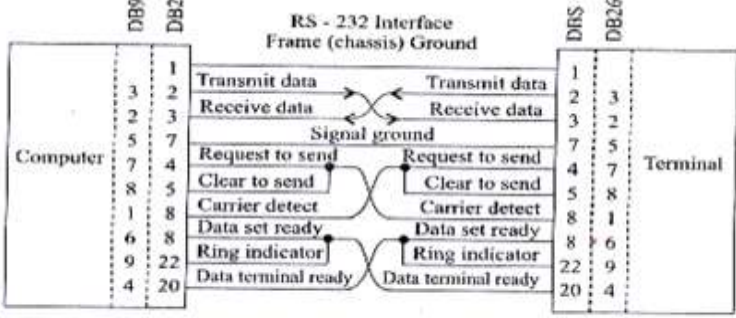


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<p>(ii) Ans</p>	<p>Draw RS-232 signal interface and explain the signals.</p>  <p style="text-align: center;">RS232 interface signal connections between computer and terminal device</p> <ul style="list-style-type: none"> • CD (Carrier Detect): It is used by computer to know that the modem connected to the serial port has made proper connection with modem on the other side. • RxD (Receive data): It is used by the device connected to the serial port to send data to the computer or Data sent from DCE to DTE. • TxD (Transmit Data): It is used by the computer to send data to a device connected to the serial port OR Data sent from DTE to DCE. • DTR (Data Terminal Ready): It is send from computer to the device connected to the serial port to inform that computer is ready for communication. • GND (Signal ground): This is one of the most important signal. This wire provides the necessary return path for both the data signals and the handshaking signals. • DSR (Data Set Ready): It is send from the device connected to the serial port to the computer to inform that the device is ready for communication. • CTS (Clear To Send): It is used by the device connected to the serial port to inform to the computer that computer can start the data transmission. • RTS (Request to send): Once Clear to send signal is received, the computer send RTS signal to the device connected to the serial port to inform that computer is also ready to start the data transmission. 	<p>6M</p> <p style="text-align: center;"><i>Diagram</i> 3M</p> <p style="text-align: center;"><i>Signal explanation</i> 3M</p>
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		<ul style="list-style-type: none"> • RI (Ring Indicator): It is used by the device connected to the serial port to inform to the computer that it has detected a ringing voltage on the telephone line. This is used by a modem connected to the serial port to inform to the computer that someone is calling the modem. 																																		
2.	a) Ans	<p>Attempt any <u>FOUR</u> of the following: Compare between OSI and TCP/IP reference model. (4 points).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Sr. No</th> <th style="width: 40%;">OSI Model</th> <th style="width: 40%;">TCP Model</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>It has 7 layers</td> <td>Has 4 layers</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Transport layer guarantees delivery of packets</td> <td>Transport layer does not guarantees delivery of packets</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Horizontal approach</td> <td>Vertical approach</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Separate presentation layer</td> <td>No presentation layer, characteristics are provided by application layer</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Separate session layer</td> <td>No session layer, characteristics are provided by transport layer</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Network layer provides both connectionless and connection oriented services</td> <td>Network layer provides only connection less services</td> </tr> <tr> <td style="text-align: center;">7</td> <td>It defines the services, interfaces and protocols very clearly and makes a clear distinction between them</td> <td>It does not clearly distinguishes between service interface and protocols</td> </tr> <tr> <td style="text-align: center;">8</td> <td>The protocol are better hidden and can be easily replaced as the technology changes</td> <td>It is not easy to replace the protocols</td> </tr> <tr> <td style="text-align: center;">9</td> <td>OSI truly is a general model</td> <td>TCP/IP cannot be used for any other application</td> </tr> <tr> <td style="text-align: center;">10</td> <td>It has a problem of protocol filtering into a model</td> <td>The model does not fit any protocol stack.</td> </tr> </tbody> </table>	Sr. No	OSI Model	TCP Model	1	It has 7 layers	Has 4 layers	2	Transport layer guarantees delivery of packets	Transport layer does not guarantees delivery of packets	3	Horizontal approach	Vertical approach	4	Separate presentation layer	No presentation layer, characteristics are provided by application layer	5	Separate session layer	No session layer, characteristics are provided by transport layer	6	Network layer provides both connectionless and connection oriented services	Network layer provides only connection less services	7	It defines the services, interfaces and protocols very clearly and makes a clear distinction between them	It does not clearly distinguishes between service interface and protocols	8	The protocol are better hidden and can be easily replaced as the technology changes	It is not easy to replace the protocols	9	OSI truly is a general model	TCP/IP cannot be used for any other application	10	It has a problem of protocol filtering into a model	The model does not fit any protocol stack.	<p>16 4M</p> <p style="text-align: center;"><i>Any four points 1M each</i></p>
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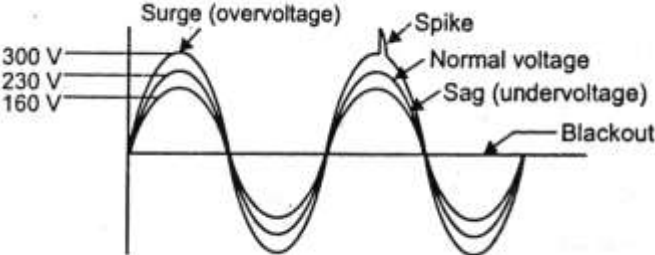


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<p>b) Ans .</p>	<p>List advantages of LCD monitor over CRT monitor. Advantages of LCD monitor over CRT monitor:</p> <ul style="list-style-type: none">• CRT monitor requires about 100W for 19" display whereas LCD monitors requires 45W for the same.• LCD monitors are lighter and thinner than CRT. They can be mounted on the wall.• LCD monitors has smaller footprint on desk, freeing up work area on the user's desk.• More usable display area than comparably sized CRTs.• Easy adjustment, storage and movement• Less eye strain.	<p>4M</p> <p><i>Any four advantages 1M each</i></p>
<p>c) Ans .</p>	<p>Define:</p> <p>(i) Blackout (ii) Brownout (iii) Surge (iv) Spikes</p> <p>(i) Blackout: It is the complete loss of electrical power where voltage and current drop to a very low value (typically zero). They are caused due to physical interruption in the local network.</p>  <p>(ii) Brownout: It is the under voltage condition caused by faulty electrical wiring or excessive electrical load on an AC circuit.</p> <p>(iii) Surge: They are small over voltage conditions that take place over relatively long periods of few milliseconds.</p> <p>(iv) Spikes: It is a large over voltage condition that occurs over short duration of few microseconds.</p>	<p>4M</p> <p><i>1M for each definition</i></p>



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	<p>d) Write fault finding and troubleshooting procedure of peripherals of PC. (Note: any other peripherals may be also considered)</p> <p>Ans . Printer : Printer not printing at all</p> <ul style="list-style-type: none">• Check and make sure all connections going to and coming from the printer are firmly in place.• Check that the printer is on-line• Print a test page. If that prints and the application you are using doesn't, contact the application's vendor for support.• Turn off the printer for 10 seconds and turn it back on. Make a note of any error messages or flashing lights when the printer is turned back on.• Reboot the computer. This generally solves most printing problems.• If the printer is connected directly to another computer, try rebooting that computer.• Try to uninstall and then re-install the network printer. <p>Keyboard: Keyboard not working</p> <ul style="list-style-type: none">• Check if the keyboard is properly connected to the port• Check for any error by restarting the computer• Check whether the Num Lock and Caps Lock keys are functioning properly while the operating system is booting up• Check for the presence of a fuse in the +5V DC supply and check it for continuity.• Neither the older five-pin DIN nor the six-pin PS/2 mini-DIN keyboards can be hot-swapped. Disconnecting or plugging in a keyboard that has this type of fuse while power is ON can cause the keyboard to fail. If the fuse is present, simply replace it with a fuse of the same type and rating.• If still not working, replace with a new keyboard. <p>Mouse : No mouse pointer on the screen</p> <ul style="list-style-type: none">• To plug in a PS2 mouse, the computer must be turned off.• Computers will not recognize a PS2 mouse if the computer is already turned on. For a USB or wireless mouse plug it in with the computer turned on. <p>If it is an optical mouse:</p>	<p>4M</p> <p><i>Any two peripherals 2M each</i></p>
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	<ol style="list-style-type: none">1. If the computer is turned on, turn over the mouse and verify its light is on. If the light is not on and it's a USB mouse:<ol style="list-style-type: none">a. unplug it and plug it back into the same USB port. If that doesn't work thenb. unplug it and plug into another USB port on the same computer. If that doesn't work thenc. Swap the mouse with a USB mouse on another computer. If the mouse doesn't work on the other computer then the mouse is defective and needs to be replaced. If no mouse works on the computer, then there is a problem with the computer2. If the mouse light is on but the pointer doesn't move (or the buttons don't work) then try putting a clean mouse pad under the mouse. If that doesn't work then follow the same steps above as if the mouse light isn't on.3. If it appears that no USB mouse will work in the computer, shutdown the computer and plug in a PS2 type mouse (has the round connector). Be sure to plug the PS2 mouse into the PS2 mouse port on the back of the computer. <p>Monitor: Monitor is blank after starting computer.</p> <ol style="list-style-type: none">1. Check to be sure that the Monitor has power and that the light is on.2. Check your cables connecting your monitor with your computer.3. Make sure all connections are firm and properly in place before retrying to start computer.4. Disconnect all devices except for the mouse, keyboard and monitor. Reboot computer to see if the issue is resolved.5. Try connecting the monitor to a different PC using the problem monitor's video cable. If it still doesn't work, try the known good monitors video cable.6. Try unplugging the monitors power cable, then wait about 20 or 30 seconds and plug it back in.7. Try installing a separate graphics card in PCI express slot.8. If none of the above troubleshooting steps does not solve the issue, then it is likely that the monitor is bad and will need to be replaced.	
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e) Ans	<p>State the meaning and functions of ARP and FTP.</p> <p>ARP: Meaning: Address resolution protocol used to convert IP address into corresponding physical or MAC address.</p> <p>Functions:</p> <ul style="list-style-type: none">• ARP takes the IP address of a host as input & gives its corresponding physical address as the output.• It sends the broadcast message to all the computers on the network for the given IP address.• The computer whose IP address matches the broadcast IP address sends a reply and along with its physical address to the broadcasting computer.• All other computers ignore the broadcast message as IP address is different• As it knows sender hardware as well as IP address, it uncast the reply so that only sender receives it. <p>FTP: Meaning: File Transfer Protocol used to transfer files over internet.</p> <p>Functions:</p> <ul style="list-style-type: none">• FTP is a stranded mechanism provided by the Internet for copying a file from one host to the other.• FTP establishes two connections between the client and server. One is for data transfer and the other is for the control information.• The fact that FTP separates control and data makes it very efficient.• The control connection uses simple rules of communication. Only one line of command or a line of response is transferred at a time.• But the data connection uses more complex rules due to the variety of data types being transferred.• FTP uses port 21 for the control connection and port 20 for the data connection.	4M <i>ARP Meaning – 1M</i> <i>Functions Any two ½ M each</i> <i>FTP Meaning – 1M</i> <i>Functions Any two ½ M each</i>
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	f) Ans	<p>Compare peer-to-peer N/W and client – server N/W.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; text-align: center;">Sr. No.</th> <th style="width: 40%; text-align: center;">Peer- to- Peer N/W</th> <th style="width: 50%; text-align: center;">Client - Server N/W</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network are called peers.</td> <td>A client Server network is a centralized network in which one computer is considered as Server and other computers are connected as clients.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>In Peer-to peer network each computer is responsible for making its own resources available to other computers on the network.</td> <td>In client Server network, server is responsible for making the resources available to clients.</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Peer to peer network is useful for a small network containing less than 8-10 computers on a single LAN.</td> <td>Client server network is useful when a large number of computers are to be connected and administered.</td> </tr> <tr> <td style="text-align: center;">4</td> <td>In a peer to peer network, a group of computers is connected together so that user can share resources and information.</td> <td>In this a group of computers are connected to a server computer, which assigns rights and permissions to computers.</td> </tr> <tr> <td style="text-align: center;">5</td> <td>In peer to peer network, each computer maintains its own accounts and their security settings.</td> <td>In client server network, administration is through centralized server.</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Individual backups to be taken for peers</td> <td>Centralized and easy backup using server</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Any operating system (OS) supporting individual PC can be installed in peers.</td> <td>Very reliable, dedicated network Operating System to be installed as a server.</td> </tr> </tbody> </table>	Sr. No.	Peer- to- Peer N/W	Client - Server N/W	1	A peer-to-peer (P2P) network is a type of decentralized and distributed network architecture in which individual nodes in the network are called peers.	A client Server network is a centralized network in which one computer is considered as Server and other computers are connected as clients.	2	In Peer-to peer network each computer is responsible for making its own resources available to other computers on the network.	In client Server network, server is responsible for making the resources available to clients.	3	Peer to peer network is useful for a small network containing less than 8-10 computers on a single LAN.	Client server network is useful when a large number of computers are to be connected and administered.	4	In a peer to peer network, a group of computers is connected together so that user can share resources and information.	In this a group of computers are connected to a server computer, which assigns rights and permissions to computers.	5	In peer to peer network, each computer maintains its own accounts and their security settings.	In client server network, administration is through centralized server.	6	Individual backups to be taken for peers	Centralized and easy backup using server	7	Any operating system (OS) supporting individual PC can be installed in peers.	Very reliable, dedicated network Operating System to be installed as a server.	<p>4M</p> <p style="text-align: center;"><i>Any four comparisons 1M each</i></p>
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6	Individual backups to be taken for peers	Centralized and easy backup using server																									
7	Any operating system (OS) supporting individual PC can be installed in peers.	Very reliable, dedicated network Operating System to be installed as a server.																									
3.	a)	<p>Attempt any <u>FOUR</u> of the following:</p> <p>Compare TCP and UDP with respect to:</p> <p>(i) Speed</p>	<p>16</p> <p>4M</p>																								



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Ans .	(ii) Reliability (iii) Acknowledgement (iv) Security	<i>Each comparison 1M</i>				
	Parameter				TCP (Transmission Control Protocol)	UDP (User Datagram Protocol)
	Speed				TCP has error checking and handshaking signals, which makes it slower.	UDP is faster than TCP as it does not have error checking and handshaking signals.
	Reliability				There is absolute guarantee that the data transferred remains intact and arrives in the same order in which it was sent. Thus reliability is more.	There is no guarantee that the messages or packets sent would reach at all, hence less reliable.
	Acknowledgement				Handshaking is done (SYN, SYN-ACK, ACK signals)	No handshake and no acknowledgement
	Security				Since TCP has acknowledgement signal, it can be considered as more secure compared to UDP	No Acknowledgement and hence less secure.
b) Ans .	With the help of diagram. Explain working of UPS.	4M				



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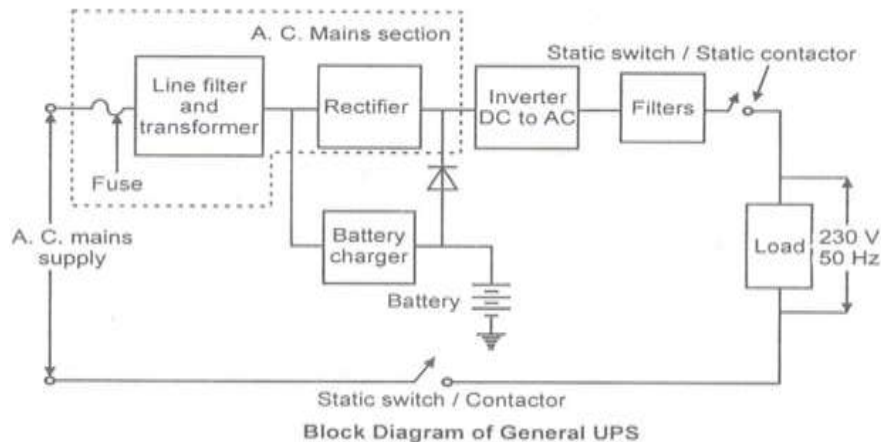


Diagram of
UPS 2M

Uninterrupted Power Supply: The UPS delivers uninterrupted power to the ac load and it consists of following functional blocks namely, AC mains section with filter, transformer and rectifier, Battery charger with circuit and battery, Static switch / contactor.

AC mains section

It receives ac supply, filters it with the help of line filters and rectifies it to the desired level of the load. This section can withstand ac input fluctuations from 170V to 250V. Thus despite of ac fluctuations UPS can deliver 230V 50Hz output to the load. When ac supply is available it charges the battery through the battery charger circuit.

Working of
UPS 2M

Battery charger with circuit and battery

It converts the ac supply to the desired dc levels and charges the battery. It has special protection to prevent overcharging of batteries. The battery charger is SCR controlled converter that charges the battery with constant current supply. The Battery specifications decide the time and amount of power delivered to the load. The batteries are usually specified using AH (Ampere Hour) as the unit.

Static Switch / contactor

In the event of power failure the inverter is connected to the load



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		with the help of switch. The inverter changes from the battery to ac of constant frequency and amplitude. It also has synchronization circuits for smooth change-over from mains to inverter ac avoid waveform distortion.	
c) Ans	<p>Draw the construction of opto-mechanical mouse and explain its working. Diagram of opto-mechanical:</p> <p>Construction of Optomechanical Mouse</p>	<p>4M</p> <p><i>Diagram of opto-mechanical 2M</i></p> <p><i>Explanation 2M</i></p>	

Opto-mechanical mouse: The basic construction is similar to that of the mechanical mouse. The only difference is that the combination of LED & photo detector is used to sense the distance traveled by the mouse.

Working: When the mouse is moved, the ball at the bottom also moves. It turns to separate roller fixed at 90o producing vertical and horizontal movement of the cursor on the screen. The encoder (wheel) connected to each roller are rotated by corresponding movements of the rollers. There are small openings on each wheel, when the wheel rotates a pair of LED & photo detector detects them. Each opening in the wheel will allow light from LED to pass through it and generate an electrical signal. The number of signals generated is directly proportional to the distance of the cursor. These signals are passed to the Pc through the wire connecting the mouse to the main system. The PC passes it to the driver software, which converts it into distance, direction and speed.

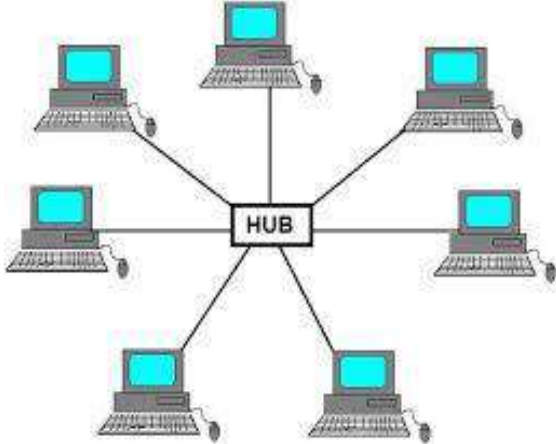


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<p>d)</p> <p>Ans</p>	<p>What is network topology? Explain star and Ring topology with its advantage (any 2)</p> <p>Network topology: The topology of a network is the geometric representation of the relationship of all the computers or links with linking devices (usually called nodes) to one another.</p> <p>Star Topology:</p> <ul style="list-style-type: none">• In this topology, nodes are connected to central cable; here all the hosts or workstations are connected to central device called hub.• All the data on the star topology passes through the central device before reaching the intended destination.  <p>Advantages:</p> <ul style="list-style-type: none">• A single computer failure does not affect the entire network.• Easy to expand – Adding new node in Network is easy.• Centralized control-It enhance N/w monitoring & management.• Fault detection is easy because all nodes are connected to central HUB <p>Ring Topology:</p> <ul style="list-style-type: none">• A network topology that is setup in circular fashion. In other words all nodes in ring topology are connected in ring structure.• In ring topology, each computer is connected to the next computer where the last computer is connected to the first.	<p>4M</p> <p><i>Definition</i> 1M</p> <p><i>Star topology</i> 1M</p> <p><i>Any 2 advantages of star topology</i> 1/2 M</p> <p><i>Ring topology</i> 1M</p>
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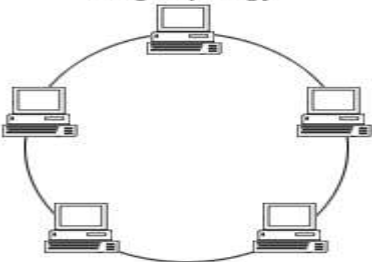
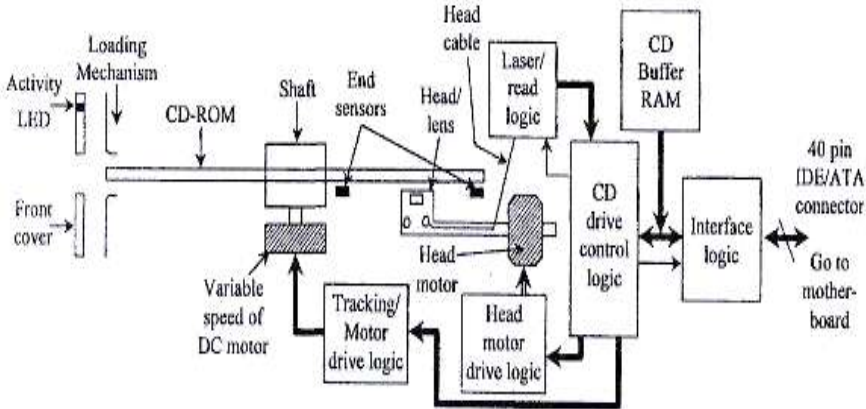


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	<p style="text-align: center;">Ring Topology</p>  <p>Advantages:</p> <ul style="list-style-type: none">• This type of network topology is very organized.• Each node gets to send the data when it receives an empty token. This helps to reduce chances of collision.• Also in ring topology all the traffic flows in only one direction at very high speed. Even when the load on the network increases, its performance is better than that of Bus topology.• There is no need for network server to control the connectivity between workstations.• Each computer has equal access to resources.	<p style="text-align: center;"><i>Any 2 advantages of ring topology 1/2 M</i></p>
<p>e) Ans</p>	<p>Explain working of CD-ROM drive. Working of CD-ROM drive:</p>  <p style="text-align: center;">OR</p>	<p style="text-align: center;">4M</p> <p style="text-align: center;"><i>Diagram of CD-ROM drive 2M</i></p>

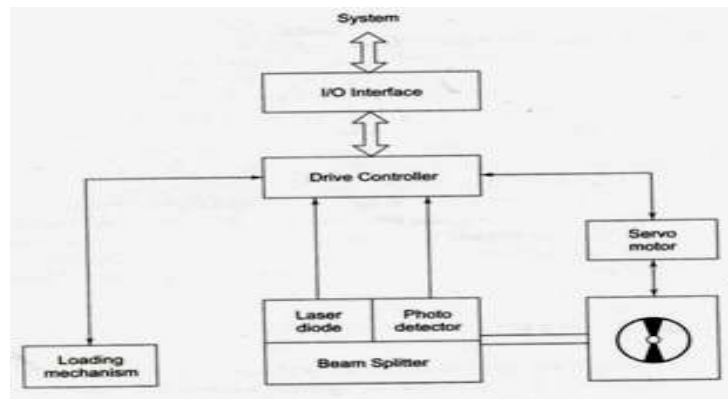


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Working of CD ROM drive:

A CD drive consists of

1. Optical head which contains laser diode, photo detector and beam splitter
2. Drive controller
3. Loading mechanism
4. Servo motor
5. I/O interface

1. The optical head contains:

- Laser diode, which generates the laser beam
- A lens system to focus the laser beam on the disc and to direct the reflected beam on to the photo detector. The beam splitter sends the reflected beam towards a different lens for focusing.
- Servo motors that control the position of laser and lenses to ensure correct tracking and focusing.
- Photo detector that detects the reflected light and converts it into electric pulses.

2. Drive controller is the overall controller of the CD drive. It controls the speed of rotation and processes the signals coming from the optical head.

3. The information coming from the photo detector is in the encoded form (8 to 14 Modulation) (EFM). The decoding of data is done by the microprocessor on the controller.

4. The decoded data is sent to the I/O interface, which makes it available to the system.

*Explanation
n 2M*



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	f) Ans .	List important features of routers used in Computer Network. Router features: <ul style="list-style-type: none">• Router is a device or a specialized computer that connects two or more networks.• It consists of a combination of hardware and software.• Router operates at the Network Layer.• The primary function of a router is to connect networks together & keep layer-2 broadcast traffic under control.• A router is typical connected to at least two networks commonly two LAN or WAN or LAN and its ISPs or more n/w connects.• Routers are located at gateways, the places where two or more networks connect.• Routers maintain a routing table which can be configured either manually or dynamically using static or dynamic routers.	4M <i>Any four features 1M each</i>
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