



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
(Autonomous)
(ISO/IEC - 27001 - 2005 Certified)

MODEL ANSWER

SUMMER - 2017 EXAMINATION

Subject: Computer Hardware & Maintenance

Subject Code: 17428

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>SIX</u> of the following: Write two features of PCI bus. Features of PCI bus: 1. Plug and Play: - Just connect device and use it. 2. Hot plug-ability: -Devices can be connected while system is running. 3. Hot swappable: - Flexibility in removing or replace device with another device without significant interruption to the system. <i>(Note: only 1 M to be awarded even if all the above three are written)</i> 4. High speed: - 32 bits and 64 bits enable PCI to transfer data at high speed. 5. Backward compatibility: - Older versions of independent bus can be connected to PCI Slot. 6. Independent bus: - Device operates independently without CPU intervention. 7. High operational frequency:- Operates at frequency up to 133MHz.	12 2M <i>Any two</i> <i>1M each</i>



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(ii) Ans.	Write function of R/W heads in HDD. Function of R/W head in HDD: 1. It is used to read data from the disk platter. 2. It is used to write data to the disk platter. 3. It is used to read servo information from the disk platter	2M <i>Any two 1M each</i>
(iii) Ans,	Write any two advantages of LCD over CRT display. Advantages of LCD over CRT: 1. LCD monitors consume less power. An average 19-inch LCD uses 45 watts of electricity while a 19-inch CRT uses 100 watts. 2. LCD monitors are smaller, thinner and weigh half as much as CRTs. 3. An LCD monitor's tilt, swivel, height and orientation from horizontal to vertical can all be adjusted easily. 4. LCD monitors don't produce the flicker that CRTs do, generating less eye strain	2M <i>Any two 1M each</i>
(iv) Ans.	Enlist four types of key switches of keyboard. Types of key switches of Keyboard: 1. Capacitive switch 2. Opto –electronic switch 3. Membrane switch 4. Mechanical switch 5. Rubber Dome switch	2M <i>Any four ½M each</i>
(v) Ans.	Write two advantages of laser printer. Advantages of Laser printer: 1. It is a non impact printer. 2. It is not noisy. 3. Printing speed is fast. 4. Printing quality is very good.	2M <i>Any two 1M each</i>
(vi) Ans.	Write any two symptoms of power problem in PC. Symptoms of power problems: 1. The lights tend to flicker or periodically vary in intensity. 2. The PC stalls, crashes or reboots for no apparent reason. 3. Chronic or frequent hard drive failure or file access problems. 4. The CMOS RAM or modem NVRAM periodically loses its contents or becomes corrupted. 5. The modem regularly loses its connection or fails data transfers. 6. The monitor display flickers or waves.	2M <i>Any two 1M each</i>



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		7. Frequent errors while writing data to the disk.	
(vii) Ans.	Write two features of FIREWIRE. Features of FIREWIRE: <ol style="list-style-type: none">1. Hot pluggability.2. Multiple devices up to 63.3. Uses daisy chain topology4. Data Transfer Rate 400/ 800 Mbps5. Snap connection: no need for device ID, jumper, DIP switch, terminators etc.6. Power sourcing.7. Dynamic reconfiguration.8. Max distance between devices: 4.5m9. Supports DMA transfers10. Well suited for different devices such as Digital Camera, Scanner, HDD, printers, music systems	2M <i>Any two 1M each</i>	
(viii) Ans.	Explain two signals of RS-232 interface. Signals of RS 232: <ol style="list-style-type: none">1. CD (Carrier Detect or Data 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.2. RxD (Receive Data): It is used by the device connected to the serial port to send data to the computer Or data send from DCE to DTE3. TxD (Transmit Data): It is used by the computer to send data to a device connected to the4. serial port Or Data sent from DTE to DCE5. DTR (Data Terminal Ready): It is send from computer to the device connected to the serial port to inform that computer is ready for communication6. 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 hand shaking signals.7. 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 communication8. RTS (Request To Send): One clear to send signal is received the computer send Request To Send (RTS) signal to the device connected to the serial port to inform that computer is also ready to	2M <i>Any two 1M each</i>	



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		<p>start the data transmission</p> <p>9. CTS (Clear To send): Clear to send or CTS signal is used by the device connected to the serial port to inform to the computer can start the data transmission.</p> <p>10. RI (Ring Indicator): RI Signal 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 signal is used by a modem connected to the serial port to inform to the computer that someone is calling the modem.</p>	
1.	b) (i) Ans.	<p>Attempt any <u>TWO</u> of the following:</p> <p>Write two functions of BIOS.</p> <p>Functions of BIOS:</p> <ol style="list-style-type: none">1. The main function of the BIOS is to give instructions for the power-on-self-test (POST). This self-test ensures that the computer has all of the necessary parts and functionality needed to successfully start itself, such as use of memory, a keyboard and other parts.2. If errors are detected during the test, the BIOS instruct the computer to give a code that reveals the problem. Error codes are typically a series of beeps heard shortly after startup.3. The BIOS also works to give the computer basic information about how to interact with some critical components such as drives and memory that it will need to load the operating system.4. Once the basic instructions have been loaded and the self-test has been passed, the computer can proceed with loading the operating system from one of the attached drives.5. Computer users can often make certain adjustments to the BIOS through a configuration screen on the computer. The setup screen is typically accessed with a special key sequence during the first moments of the startup. This setup screen often allows users to change the order in which drives are accessed during startup and control the functionality of a number of critical devices. Features vary among individual BIOS versions.6. Many PC manufacturers today use flash memory cards to hold BIOS information. This allows users to update the BIOS version on computers after a vendor releases an update. This system was designed to solve problems with the original BIOS or to add new functionality. Users can periodically check for updated BIOS versions, as some vendors release a dozen or more updates over	8 4M <i>Any four 1M each</i>



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		the course of a products lifetime. To check for updated BIOS, users can check the website of the specific hardware vendor.																																		
(ii) Ans.	<p>Compare Active and Passive matrix LCD (any four points).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 40%;">Active Matrix LCD</th> <th style="width: 40%;">Passive Matrix LCD</th> </tr> </thead> <tbody> <tr> <td>Contrast</td> <td>Good(100+)</td> <td>Poor(10-20)</td> </tr> <tr> <td>Viewing Scale</td> <td>Wide</td> <td>Limited</td> </tr> <tr> <td>Gray Scale</td> <td>256</td> <td>16</td> </tr> <tr> <td>Response time</td> <td>Fast(<50ms)</td> <td>Slow(100-200ms)</td> </tr> <tr> <td>Multiplex ratio</td> <td>>1000</td> <td>480</td> </tr> <tr> <td>Manufacturability</td> <td>Complex</td> <td>>1000</td> </tr> <tr> <td>Cost</td> <td>High</td> <td>Moderate</td> </tr> <tr> <td>Used in</td> <td>Colour monitor</td> <td>Monochrome monitor</td> </tr> <tr> <td>Technology</td> <td>A switching device (transistor) and a storage capacitor are integrated at the each cross point of the electrodes.</td> <td>A technology that uses a grid of vertical and horizontal wires to display an image on the screen.</td> </tr> <tr> <td></td> <td>To address a particular pixel, proper row is switched on and charge is sent down the correct column</td> <td>To turn on a pixel, the integrated circuit sends a charge down the correct column of one substrate and a ground activated on the correct row of the other.</td> </tr> </tbody> </table>			Active Matrix LCD	Passive Matrix LCD	Contrast	Good(100+)	Poor(10-20)	Viewing Scale	Wide	Limited	Gray Scale	256	16	Response time	Fast(<50ms)	Slow(100-200ms)	Multiplex ratio	>1000	480	Manufacturability	Complex	>1000	Cost	High	Moderate	Used in	Colour monitor	Monochrome monitor	Technology	A switching device (transistor) and a storage capacitor are integrated at the each cross point of the electrodes.	A technology that uses a grid of vertical and horizontal wires to display an image on the screen.		To address a particular pixel, proper row is switched on and charge is sent down the correct column	To turn on a pixel, the integrated circuit sends a charge down the correct column of one substrate and a ground activated on the correct row of the other.	<p>4M</p> <p><i>Any four 1M each</i></p>
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(iii) Ans.	<p>Draw block diagram of video accelerator card and explain its blocks.</p> <p>Video accelerator card: The core of the accelerator is the graphics chip (or Video chipset). The graphics chip connects directly with the PC expansion bus. Graphics command and data are transmitted into pixel data and stored in Video memory offers a second data bus that is routed directly to the Video board's RAM DAC (Random Access Memory Video to Analog Converter). The graphics chip directs RAM DAC operation and ensures that VRAM data is available. The RAM DAC then</p>		<p>4M</p> <p><i>2M explanation</i></p>																																	

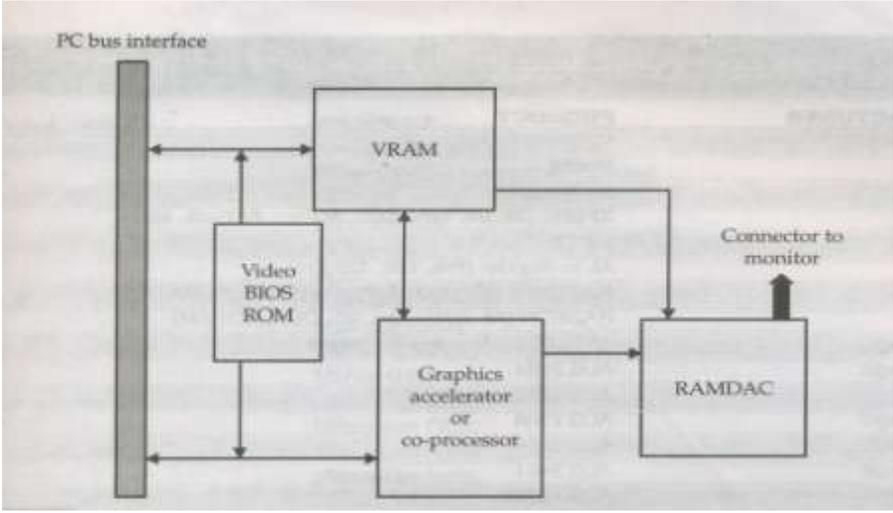


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		<p>translates Video data into red, green and horizontal and vertical synchronization signals output signals generated by the monitor. This architecture may appear simple, but this is due to high level of integration provided by the chipsets being used.</p> 	<p>2M diagram</p>
<p>2.</p>	<p>a) Ans.</p>	<p>Attempt any <u>FOUR</u> of the following: State any four features of H67 or P67 chipset. <i>(Note: Any other relevant feature may be considered)</i> Features of H67 or P67:</p> <ul style="list-style-type: none"> a) Support for 2nd generation Intel® Core™ processor family b) Support for HDMI, Display Port*, eDP and DVI 2 c) Dual independent display expands the viewable workspace to two monitors(Multi-monitor support with Windows 7) d) Intel® Rapid Storage Technology (Intel® RST) e) Serial ATA (SATA): Next generation high-speed storage interface supporting up to 6 Gb/s transfer rates for optimal data access with up to 2 SATA ports. f) High-speed storage interface supporting up to 4 SATA ports (3 Gb/s) g) PCI Express 2.0 Interface -8 PCI Express 2.0 x1 ports, configurable as x2 and x4 h) Provides Gigabit LAN connect <p style="text-align: center;">OR</p>	<p>16 4M</p> <p>Any four 1M each</p>



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	<p>8 features of P67 Chipset :</p> <ul style="list-style-type: none">a) Supports the 2nd generation Intel® Core™ processors with Intel® Turbo Boost Technologyb) Intel® Rapid Storage Technology 10.0c) Intel® Rapid Recover Technologyd) Intel® High Definition Audioe) USB 2.0 Rate Matching Hubf) Serial ATA (SATA) :, Next generation high-speed storage interface supporting up to 6 Gb/s transfer rates for optimal data access with up to 2 SATA ports.g) High-speed storage interface supporting up to 4 SATA ports (3 Gb/s)h) PCI Express* 2.0 Interface.	
<p>b)</p> <p>Ans.</p>	<p>Describe in brief following terms related to HDD.</p> <p>(i) Track (ii) Sector (iii) Cylinder (iv) Cluster</p> <p>(i) Track:</p> <ul style="list-style-type: none">• Each side of HDD platters surface is divided into concentric circles called tracks• They are magnetic information written during formatting of HDD• Outermost track is called track 0. The innermost will have the highest number. <div data-bbox="487 1449 1104 1785" data-label="Diagram"></div> <p>(ii) Sector:</p> <ul style="list-style-type: none">• A track is a big area to store data (5000 bytes). Hence tracks are	<p>4M</p> <p><i>1M each term</i></p>



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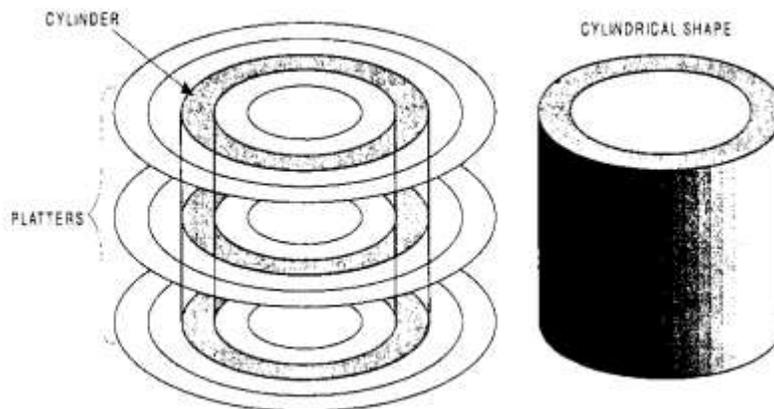
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divided into sectors

- The formatting program divides disk surface into sectors by writing magnetic pattern on disk surface
- Different HDD capacities have different number of tracks
- 512 byte data can be stored in each sector. Sector no. starts from 1

(iii) Cylinder:

- Same tracks of different platters form an imaginary cylinder like structure
- Data is stored cylinder by cylinder
- All tracks on a cylinder are written and then the R/W head moves to the next cylinder. This reduces movement of R/W head and increases the speed of read and write operation



(iv) Cluster:

- When OS writes some information on the hard disk, it does not allocate the space sector wise, instead uses a new unit of storage called “Cluster”
- Clusters are the minimum space allocated by DOS when storing any information on the disk
- Even to store only one byte long information on the disk requires minimum one cluster area on the disk surface
- A cluster can be made up of one or more sectors; it depends on



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		<p>disk type being used.</p> <ul style="list-style-type: none">• This reduces the size of FAT that DOS uses to keep track of the used and the empty disk space• First cluster no. is taken as 2• Clusters are used to allocate the storage area for data area only, FAT and directory areas are not allocated according to the cluster size	
c) Ans.	<p>Draw block diagram of CD-ROM and explain its blocks. A CD drive consists of</p> <ol style="list-style-type: none">1. Optical head which contains laser diode, photo detector and beam splitter2. Drive controller3. Loading mechanism4. Servo motor5. I/O interface <p>1. The optical head contains:</p> <ul style="list-style-type: none">• 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. <p>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.</p> <p>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.</p> <p>4. The decoded data is sent to the I/O interface, which makes it available to the system</p>	<p>4M</p> <p><i>Explanation 2M</i></p>	



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			<p><i>Diagram</i> 2M</p>
d) Ans.	<p>Describe procedure of partitioning of HDD. Procedure to create partition: - Method 1: 1. Use fdisk.exe command prompt utility to create partitions. Method 2: 1. Run diskmgmt.msc utility. 2. Select volume which is to be partitioned in small/logical volume. 3. Right click and select shrink volume option. 4. Set Size and Assign Drive name. 5. Format new drive with appropriate file system.</p>	<p>4M</p> <p style="text-align: center;"><i>Procedu re of partition ing of HDD</i> 4M</p>	
e) Ans.	<p>Define following characteristics of CRT monitor. (i) Dot pitch (ii) Resolution (iii) Aspect ratio (iv) Horizontal scanning frequency</p> <p>(i) Dot pitch: It is the distance between each group (triad) of red, blue and green phosphors. A smaller dot pitch helps produce sharper and clearer image</p>	<p>4M</p> <p style="text-align: center;"><i>1M for each definitio n</i></p>	



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		<p>(ii) Resolution: Resolution describes the number of potential pixels the monitor is capable of displaying. Resolution = Total Horizontal Pixels x Total vertical pixels</p> <p>(iii) Aspect ratio: The aspect ratio of a computer display is the proportional relationship between its width and its height.</p> <p>(iv) Horizontal scanning frequency: The frequency at which the monitor repaints the horizontal lines that make up a single line of image.</p>	
f) Ans.	<p>Describe working of membrane keyswitch with diagram.</p> <p>Working of membrane keyswitch: It is multilayer plastic or rubber assembly, two rubber or plastic sheet are used as row and column conductor sheet and row and column sheet having lines made up of silver or some other conductor ink row and column sheet separated by another sheet with holes at key top position. When Key pressed- it forces the row conductor sheet through the hole to touch the column conductor sheet, Row conductor lines now touches with column conductor lines, key contact is made, Keyboard interface interpreted as key is pressed.</p>		<p>4M</p> <p><i>Explanation 2M</i></p> <p><i>Diagram 2M</i></p>
3. a) Ans.	<p>Attempt any FOUR of the following: Draw North/South bridge architecture block diagram.</p>	<p>16 4M</p>	



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		<p>The diagram illustrates the system architecture of a computer. At the top is the CPU, connected to the Northbridge via a Front Side Bus (FSB). The Northbridge is connected to the AGP (Accelerated Graphics Port) on the left and RAM (Random Access Memory) on the right. Below the Northbridge is the Southbridge, connected by a red vertical line. The Southbridge is connected to various peripheral devices: PCI, USB, ISA, IDE, BIOS, and Legacy components.</p>	<p><i>Correct Diagram 4M</i></p>
<p>b) Ans.</p>		<p>List four disadvantages of CRT.</p> <ol style="list-style-type: none">1. Physical: They are large, heavy, and bulky. They consume a lot of electricity and produce a lot of heat.2. Brightness: Relatively bright but not as bright as LCDs. Not suitable for very brightly lit environments.3. Emissions: CRTs give off electric, magnetic and electromagnetic fields. There is considerable controversy as to whether any of these pose a health hazard, particularly magnetic fields. The most authoritative scientific studies conclude that they are not harmful but some people remain unconvinced.4. Sharpness: The CRT's Gaussian beam profile produces images with softer edges that are not as sharp as an LCD at its native resolution. Imperfect focus and color registration also reduce sharpness. Generally sharper than LCDs at other than native resolutions.5. Screen Shape: Some CRTs have a rounded spherical or cylindrical shape screen. Newer CRTs are flat.	<p>4M</p> <p><i>Any four disadvantages 1M each</i></p>



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	<p>6. Geometric Distortion: Subject to geometric distortion and screen regulation problems. Also affected by magnetic fields from other equipment including other CRTs.</p> <p>7. Interference: All color CRTs produce annoying Moiré patterns. Many monitors include Moiré reduction, which normally doesn't eliminate the Moiré interference patterns entirely.</p>													
c) Ans.	<p>List four features of USB.</p> <p>Features of USB:</p> <ol style="list-style-type: none"> Up to 127 different devices can be connected on a single USB bus. Initial USB standard supported 12 Mbps transfer rate. Currently 60 Mbps is supported. Supports wide range of peripherals such as keyboard, mouse, printer, FDD, game pad, joystick etc. Devices are not daisy chained. Each device is connected to USB hub, which is an intelligent device interacting with the PC on one side and USB peripheral devices on the other side. A USB device can be connected without powering off the PC. The plug and play feature in the BIOS together with intelligence in the USB device takes care of detection, device recognition and handling. USB controller in the PC detects the presence or absence of USB devices and does power allocation. The CPU/software initiates every transaction on the USB bus. Hence the overhead on the PC software increases. 	<p>4M</p> <p><i>Any Four Features 1M each</i></p>												
d) Ans.	<p>State any four beep codes with their meaning in troubleshooting. For IBM PCs:</p> <table border="1"> <thead> <tr> <th align="center">Beep Code</th> <th align="center">Description</th> </tr> </thead> <tbody> <tr> <td>No Beeps</td> <td>No Power, Loose Card, or Short.</td> </tr> <tr> <td>1 Short Beep</td> <td>Normal POST, computer is ok.</td> </tr> <tr> <td>2 Short Beep</td> <td>POST error, review screen for error code.</td> </tr> <tr> <td>Continuous Beep</td> <td>No Power, Loose Card, or Short.</td> </tr> <tr> <td>Repeating Short Beep</td> <td>No Power, Loose Card, or Short.</td> </tr> </tbody> </table>	Beep Code	Description	No Beeps	No Power, Loose Card, or Short.	1 Short Beep	Normal POST, computer is ok.	2 Short Beep	POST error, review screen for error code.	Continuous Beep	No Power, Loose Card, or Short.	Repeating Short Beep	No Power, Loose Card, or Short.	<p>4M</p> <p><i>Any four beep codes with meaning 1M each</i></p>
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	<table border="1"><tbody><tr><td>One Long and one Short Beep</td><td>Motherboard issue.</td></tr><tr><td>One Long and Two Short Beeps</td><td>Video (Mono/CGA Display Circuitry) issue.</td></tr><tr><td>One Long and Three Short Beeps.</td><td>Video (EGA) Display Circuitry.</td></tr><tr><td>Three Long Beeps</td><td>Keyboard or Keyboard card error.</td></tr></tbody></table>	One Long and one Short Beep	Motherboard issue.	One Long and Two Short Beeps	Video (Mono/CGA Display Circuitry) issue.	One Long and Three Short Beeps.	Video (EGA) Display Circuitry.	Three Long Beeps	Keyboard or Keyboard card error.													
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e) As.	<p>Give POST sequence of PC. <i>(Note: Partial marking can be consider for appropriate sequence)</i> POST sequence of PC:</p> <ol style="list-style-type: none">1. CPU test2. BIOS ROM Checksum test3. Timer 1 test4. DMA controller test5. 16 KB DRAM test6. Interrupt controller initialization7. Interrupt controller test8. Timer 0 initialization9. CRT controller test10. DRAM after 16 KB test11. Keyboard test12. Disk drive test	4M <i>Correct sequence 4M</i>																				

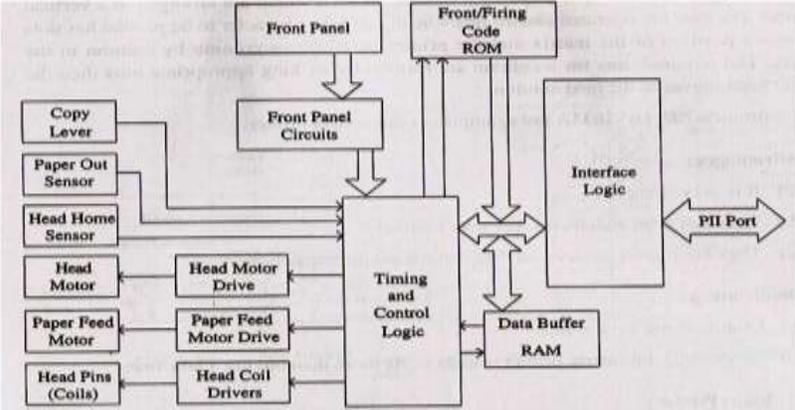
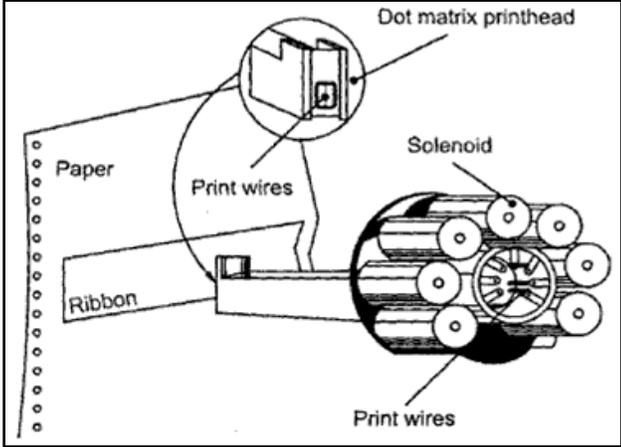


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		<p>representing black or white.</p> <ul style="list-style-type: none">➤ For color scanner, the scan head makes three passes under the images and the light on each pass is directed through a red, green or blue filter before it strikes the original image.➤ Signals from three passes are converted into digital information and stored to represent red, green, or blue color value of the scanned area on the page.➤ This digital information is sent to the software in the PC, where data is stored in a format on which a graphics program or OCR can work.	
b) Ans.		<p>Draw block diagram of Dot matrix printer and explain its working.</p>   <p>The block diagram illustrates the internal components of a dot matrix printer. At the top, the Front Panel and Front/Firing Code ROM are connected to Front Panel Circuits. The Front Panel Circuits are linked to the Timing and Control Logic. The Timing and Control Logic is connected to the Interface Logic, which in turn connects to the PII Port. The Timing and Control Logic also manages the Data Buffer RAM. The Timing and Control Logic is connected to the Head Motor Drive, Paper Feed Motor Drive, and Head Coil Drivers. The Head Motor Drive is connected to the Head Motor, the Paper Feed Motor Drive is connected to the Paper Feed Motor, and the Head Coil Drivers are connected to the Head Pins (Coils). The Head Home Sensor, Paper Out Sensor, and Copy Lever are also connected to the Timing and Control Logic. The cross-sectional diagram shows the dot matrix printhead positioned above the paper. The printhead is connected to the solenoid and print wires. The ribbon is positioned between the printhead and the paper.</p>	4M <i>Block diagram</i> 2M

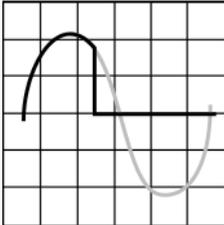


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		<p>A Dot Matrix Printer, also known as an impact matrix printer, works similar to a ribbon typewriter where pressure is applied to an ink source, an ink-soaked cloth ribbon in this case, onto the paper to leave an imprint. The ink transfers to the paper as a dot which combines to form recognizable characters.</p> <p>A printer having at least one reciprocally mounted printing member controlled to impact against a printing surface by selective energization of an associated printing driving member. The forward end of the member is guided by a bearing. Ink from a supply source is directed to the printing member near the forward end of the printing member whereby the ink is drawn into the region between the guide hole in the printing member guide bearing and the periphery of the printing member to be moved to the region in front of the forward tip of the printing member whereby activation of the driving member abruptly moves the printing member in the forward printing direction causing the ink deposited upon the tip of the printing member to be urged toward and against the ink receiving medium to transfer the ink to the ink receiving medium. A group of printing members may be used to print in this manner to collectively form characters, symbols, and even graphic patterns. The dots are produced by a tiny metal rod, also called a "wire" or "pin", which is pushed by a tiny electromagnet or solenoid, either directly or through small levers called pawls. The moving portion of the printer is called the print head.</p>	<p><i>Description 2M</i></p>
	<p>c) Ans.</p>	<p>Explain four power supply problems.</p> <p>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> <div style="text-align: center;">  </div> <p>Brownout: It is the under voltage condition caused by faulty electrical wiring or excessive electrical load on an AC circuit.</p>	<p>4M</p> <p style="text-align: right;"><i>1M for each power supply problem</i></p>

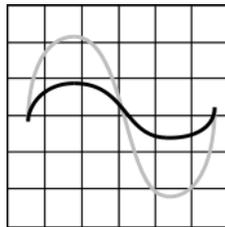


MODEL ANSWER

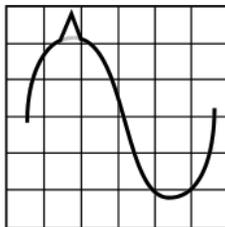
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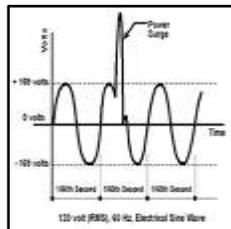
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Power Spike: A very short pulse of energy on a power line. Power spikes can contain very high voltages – up to and beyond 6000 volts – but usually last only a few milliseconds



Surges: They are small over voltage conditions that take place over relatively long periods of few milliseconds.



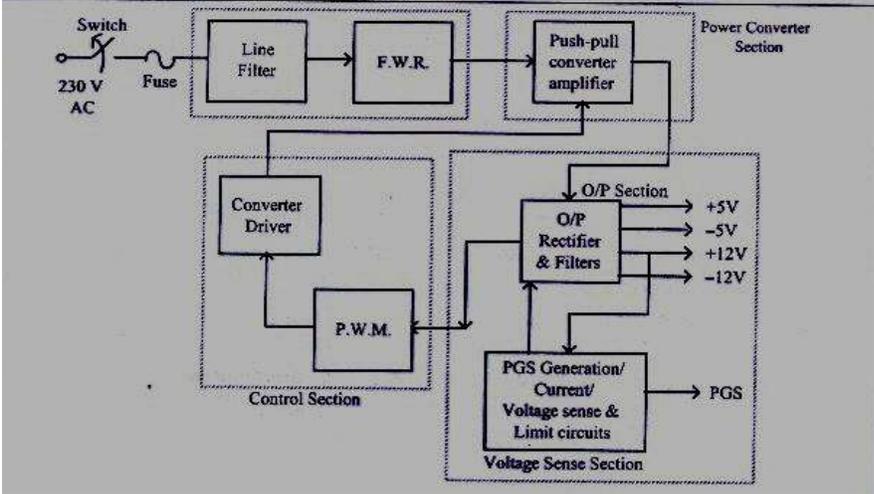


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<p>d) Ans.</p>	<p>Draw block diagram of SMPS and explain its blocks.</p>  <p>SMPS in a PC has five sections:</p> <p>AC input section Receives unregulated input AC supply from mains. This signal is filtered using line filter and given to full wave rectifier for rectification. The fuse protects the SMPS from over current draining.</p> <p>Power converter It consists of push pull configuration of transistors which are driven by converter driver from the control section. Only desired quantity of power is delivered to the load.</p> <p>Control section It senses over voltage or over current at load. It changes the turn on time of the transistors in the push pull amplifier so that output power can be controlled. It applies Pulse Width Modulated Waveforms to converter driver circuit at 22 KHz frequency.</p> <p>Output section It rectifies and filters the power received from the power section. It provides short circuit and overload protection to the power applied to the load.</p> <p>Voltage sense section It generates Power Good Signal (PGS). When all four voltage outputs (+5V, -5V, +12V, -12V) are steady above minimum sense levels for more than 100ms, PGS is generated by this section. It checks the</p>	<p>4M</p> <p><i>Block diagram 2M</i></p> <p><i>Description 2M</i></p>
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		<p>maximum load current and compares it with specified current. If the connected load exceeds the specified load, current limit circuits shut off the output section of the SMPS, thereby avoiding damage due to over current flow.</p>	
e) Ans.	<p>State any four features of USB. Features of USB:</p> <ol style="list-style-type: none"> 1. Up to 127 different devices can be connected on a single USB bus. 2. Initial USB standard supported 12 Mbps transfer rate. Currently 60 Mbps is supported. 3. Supports wide range of peripherals such as keyboard, mouse, printer, FDD, game pad, joystick etc. 4. Devices are not daisy chained. Each device is connected to USB hub, which is an intelligent device interacting with the PC on one side and USB peripheral devices on the other side. 5. A USB device can be connected without powering off the PC. The plug and play feature in the BIOS together with intelligence in the USB device takes care of detection, device recognition and handling. 6. USB controller in the PC detects the presence or absence of USB devices and does power allocation. 7. The CPU/software initiates every transaction on the USB bus. Hence the over head on the PC software increases. 	<p>4M</p> <p style="text-align: center;"><i>Any Four Features 1M each</i></p>	
f) Ans.	<p>Draw centronics interface. Also list and write functions of signals from PC to printer.</p> <div style="text-align: center;"> </div>	<p>4M</p> <p style="text-align: center;"><i>Diagram 2M</i></p>	



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		<p>Following are Signals from PC to Printer:-</p> <p><u>STROBE</u> : The printer should take data when this signal is low.</p> <p><u>INIT</u>: When it is low the printer resets the electronics logic and clears the printer buffer.</p> <p><u>SLCT IN</u>: It is an interface enable signal. When it is low the printer responds to the signals from the controller.</p> <p><u>AUTOFDXT</u>: - After printer every line, the printer will provide one line feed automatically if this signal is low. This type of line feed is known as hardware line feed. There are five status signals from printer to PC.</p>	<p><i>Signals from PC to printer with Functions 2M</i></p>
5.	a) Ans.	<p>Attempt any <u>TWO</u> of the following:</p> <p>Explain any eight motherboard selection criteria.</p> <p>Motherboard Selection Criteria:</p> <ul style="list-style-type: none">• Motherboard Chipset: Motherboard should use a high performance chipset that supports DDR or DDR2 SDRAM DIMMs. It should also support PCI- Express X16 video support and Serial ATA or faster hard drive support.• Processor: A modern system should use a socket based processor with on-die L2 cache. The processor should have highest speed CPU bus (Front Side Bus: FSB).• Processor Sockets: For maximum upgradability and performance, a socket based system should be used. The main sockets used are Socket A(Socket 426) for Athlon XP and Socket 775 for Pentium 4.• Motherboard Speed: 200MHz to 400MHz for Duron/Athlon/Athlon XP –based boards and 400MHz to 1066MHz for Pentium 4 based boards.• Cache Memory: Use a processor with full core speed on-die L2 cache as it offers maximum in performance.• SIMM/DIMM/RIMM memory: Current systems use either DDR or DDR2 DIMMs. Currently DDR and DDR2 SDRAM and RDRAM are the fastest type of memory available, with RDRAM being by far the most costly.• Bus Type: Current systems offer PCI as well as PCI Express slots. PCI slots should conform with PCI 2.1 or later revision. Systems without on-board video should also feature PCI Express X 16 slot.	<p>16 8M</p> <p><i>Any eight 1M each</i></p>



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	<ul style="list-style-type: none"> • Basic Input Output System (BIOS): The motherboard should use industry standard BIOS such as those from AMI, Phoenix or Award. The BIOS should be of a flash ROM or EEPROM design for easy updating. • Form Factor: For maximum flexibility, performance, reliability and ease of use, motherboard with ATX form factor should be used. • Built-in Interfaces: The motherboard should contain as many built-in standard controllers and interfaces as possible. • On-board IDE interfaces: It should be included on the motherboard. • Power Management: The motherboard should support the latest standard for power management which is ACPI. • Documentation: Good technical documentation is essential. It should include information on all jumpers and switches found on the board, connector pin out for all connectors, specifications for other plug-in components etc. • Technical Support: Good online technical support goes beyond documentation. It includes driver and BIOS updates, FAQs, updated tables of processor and memory compatibility, and the utility programs to help you monitor the condition of your system. 	
<p>b) Ans.</p>	<p>Explain extended and expanded memory. <i>(Note: Separate diagram or single diagram can also be considered).</i> Extended and Expanded memory diagram:</p> <p style="text-align: center;">Conventional extended and expanded memory</p>	<p style="text-align: center;">8M</p> <p style="text-align: center;"><i>Extende d Memory diagram 1M</i></p> <p style="text-align: center;"><i>Expande d Memory diagram 1M</i></p>



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		<p>Extended Memory:</p> <ul style="list-style-type: none">• It is the memory beyond 1 MB limit.• Any memory available after 1 MB is called extended memory.• It is available in 286 and later processors only.• Extended memory is of no use for DOS users because DOS does not use this memory.• For windows users this memory is very useful as the OS can use this extended memory by allowing multiple DOS programs to run in the extended memory in its own 640 KB memory area. <p>Expanded Memory:</p> <ul style="list-style-type: none">• Expanded Memory specification which defines a method to access system memory above 1 MB of RAM on PC XT and AT computers.• This memory is accessed via 16 KB window within the first 1 MB memory.• Expanded memory is not a part of main memory, it is separately installed into the system which can be accessed in fixed size pages using a method called „bank switching“.• In bank switching a small window located in the upper memory area in the main memory is used to view the contents of EMS.• This window is located in the memory location between 640KB and 1024KB i.e. UMA.• Expanded memory is arranged in blocks of 16KB each.• To access this memory 1 block of EMS is copied into the window in the main memory and after processing it is copied back to the EMS memory.	<p><i>Extended memory Explanation-3M</i></p> <p><i>Expanded memory explanation 3M</i></p>
	<p>c) Ans.</p>	<p>Draw block diagram of internal MODEM and explain its blocks. Also state its two disadvantages.</p> <p>Block Diagram of internal MODEM:</p>	<p>8M</p>

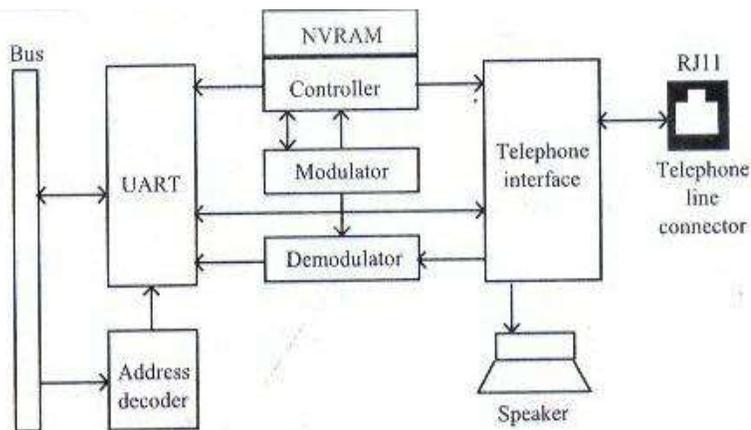


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*Block
diagram
4M*

It contains its own Universal Asynchronous Receiver/Transmitter (UART).

A modulator Circuit converts the serial data from the computer into audio signals to be transmitted over telephone lines. This modulated audio is then coupled to the telephone line. The signal passes through telephone jack (RJ 11) connector at the rate of the modem to the telephone line.

On the receiver side, signals received from the telephone line must be translated into serial data. The telephone interface separates the received signals and passes them to the demodulator. After demodulation the resulting serial data is passed to UART, which in turn converts the serial bits into parallel words that are placed on the system's data bus.

The telephone interface also generates Dual Tone multi Frequency (DTMF) dialing signals needed to reach a remote modem. When the remote modem dials in, the telephone interface detects the incoming signal and alerts the UART to begin negotiating a connection.

The telephone interface drives a speaker. During the initial stages of modem operation the speaker is used to hear the dial tone, dialing signals, and audio negotiation between the two modems. Once the connection is established, the speaker is disabled.

The controller circuit manages the overall operation of the modem. It switches the modem between the control and data operating modes. The controller accepts commands from the modulator that allow the modem characteristics and operating parameters to be changed.

In the event of power loss or reset conditions default modem

*Explana
tion 3M*



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		<p>parameters can be loaded from NVRAM. Permanent changes to modem parameters are stored in the NVRAM.</p> <p>Disadvantages of internal modem:</p> <ul style="list-style-type: none"> • No status lights and sensors available like external modem, hence monitoring the internal modem is not possible. • More heat produced in the computer, since it is placed inside the CPU. • Takes power from the CPU, whereas external modem has separate power supply. 	<p><i>Any 2 disadvantages – each ½ M</i></p>																																
6.	<p>a) Ans.</p>	<p>Attempt any <u>TWO</u> of the following: Give eight specifications of bluray disc with typical values. Blue Ray Disc specifications with values:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Specification</th> <th style="text-align: center;">Typical Value</th> </tr> </thead> <tbody> <tr><td>Capacity (Single Layer)</td><td>23.3GB/25GB/27GB</td></tr> <tr><td>Capacity (Dual Layer)</td><td>46.6GB/50Gb/54Gb</td></tr> <tr><td>Laser wavelength</td><td>405nm (blue-violet)</td></tr> <tr><td>Lens Numerical Aperture</td><td>0.85</td></tr> <tr><td>Cartridge dimensions</td><td>129X131X7mm (Approx)</td></tr> <tr><td>Disc Diameter</td><td>120mm</td></tr> <tr><td>Disc Thickness</td><td>1.2mm</td></tr> <tr><td>Optical Protection Layer</td><td>0.1mm</td></tr> <tr><td>Tracking Pitch</td><td>0.32µm</td></tr> <tr><td>Shortest Pit Length</td><td>0.160/0.149/0.138µm</td></tr> <tr><td>Recording Density</td><td>16.8/18.0/19.5 Gb/Sq. In</td></tr> <tr><td>Data transfer rate</td><td>36Mbps</td></tr> <tr><td>Recording Format</td><td>Phase Change Recording</td></tr> <tr><td>Tracking Format</td><td>Groove Recording</td></tr> <tr><td>Video Format</td><td>MPEG2</td></tr> </tbody> </table>	Specification	Typical Value	Capacity (Single Layer)	23.3GB/25GB/27GB	Capacity (Dual Layer)	46.6GB/50Gb/54Gb	Laser wavelength	405nm (blue-violet)	Lens Numerical Aperture	0.85	Cartridge dimensions	129X131X7mm (Approx)	Disc Diameter	120mm	Disc Thickness	1.2mm	Optical Protection Layer	0.1mm	Tracking Pitch	0.32µm	Shortest Pit Length	0.160/0.149/0.138µm	Recording Density	16.8/18.0/19.5 Gb/Sq. In	Data transfer rate	36Mbps	Recording Format	Phase Change Recording	Tracking Format	Groove Recording	Video Format	MPEG2	<p>16 8M</p> <p style="margin-top: 20px;"><i>Any 8 specification- each 1M</i></p>
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	<p>b) Ans.</p>	<p>Draw waveform and calculate number of pulses for data pattern 10011100 by encoding it using FM, MFM and RLL recording techniques.</p>	<p>8M</p>																																



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		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Binary Digit</th> <th style="width: 10%;">1</th> <th style="width: 10%;">0</th> <th style="width: 10%;">0</th> <th style="width: 10%;">1</th> <th style="width: 10%;">1</th> <th style="width: 10%;">1</th> <th style="width: 10%;">0</th> <th style="width: 10%;">0</th> <th style="width: 10%;">No. Of Pulses</th> </tr> </thead> <tbody> <tr> <td>FM Pulses</td> <td>PP</td> <td>PN</td> <td>PN</td> <td>PP</td> <td>PP</td> <td>PP</td> <td>PN</td> <td>PN</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">12</td> </tr> <tr> <td>Waveform FM</td> <td colspan="8" style="text-align: center;"> </td> </tr> <tr> <td>MFM Pulses</td> <td>NP</td> <td>NN</td> <td>PN</td> <td>NP</td> <td>NP</td> <td>NP</td> <td>NN</td> <td>PN</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">6</td> </tr> <tr> <td>Waveform MFM</td> <td colspan="8" style="text-align: center;"> </td> </tr> <tr> <td>RLL encoding digits</td> <td colspan="2" style="text-align: center;">10</td> <td colspan="3" style="text-align: center;">011</td> <td colspan="2" style="text-align: center;">10</td> <td style="text-align: center;">0</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">3</td> </tr> <tr> <td>RLL Pulses</td> <td colspan="2" style="text-align: center;">N P N N</td> <td colspan="3" style="text-align: center;">N N P N N N</td> <td colspan="2" style="text-align: center;">N P N N</td> <td style="text-align: center;">*</td> </tr> <tr> <td>Waveform RLL</td> <td colspan="8" style="text-align: center;"> </td> </tr> </tbody> </table>	Binary Digit	1	0	0	1	1	1	0	0	No. Of Pulses	FM Pulses	PP	PN	PN	PP	PP	PP	PN	PN	12	Waveform FM									MFM Pulses	NP	NN	PN	NP	NP	NP	NN	PN	6	Waveform MFM									RLL encoding digits	10		011			10		0	3	RLL Pulses	N P N N		N N P N N N			N P N N		*	Waveform RLL									<p><i>Correct waveform 2M each</i></p> <p><i>Correct number of pulses 2M</i></p>
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c)	Ans.	<p>Draw block diagram of On-line and Off-line UPS and explain their working when main supply ON and OFF. Also state their two advantages.</p> <p>Online UPS:</p> <p>Diagram:</p> <div style="text-align: center;"> <pre> graph LR A[230 V 50Hz AC] --> B[Rectifier AC to DC] B --> C[Battery DC] C --> D[Inverter DC to AC] D --> E[230 V 50 Hz AC] </pre> </div> <p>It contains a transformer, a rectifier and a filter which convert AC into DC</p> <p>This DC is given to the battery charger which charges the battery. The output of the battery is given to the inverter which converts DC to AC and gives it to the PC. In this type of UPS the system is supplied power from the batteries continuously. Thus the battery charges continuously and it provides DC voltage to the inverter The inverter converts DC to 230V, 50Hz AC signal and gives it to the computer.</p> <p>Thus, when the main supply is ON or OFF, the output is obtained</p>								<p>8M</p> <p><i>Online UPS – block diagram 1M</i></p> <p><i>Explanation- 2M</i></p>																																																																					



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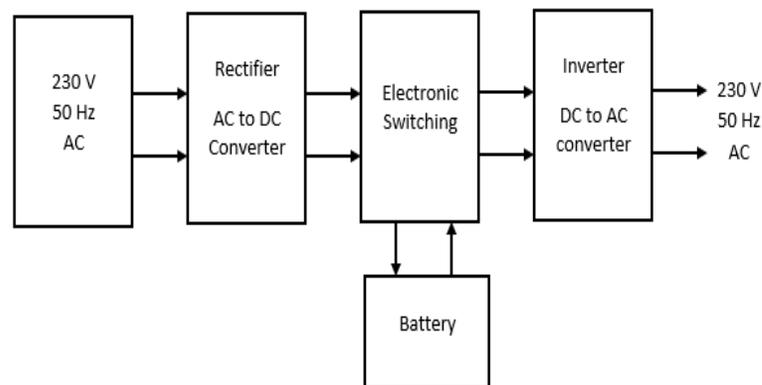
continuously from battery and inverter.

Advantages:

- Since switching is not involved, it avoids resetting of PC and spike generation.
- On line UPS isolates AC mains from the PC whereas no such provision in Offline UPS.
- On- Line UPS provides protection against all common power problems, since it has power conditioner, which is not available in Off-line UPS.
- Simpler/ fewer parts/blocks in Online UPS when compared to Offline UPS.
- Voltage regulation is better
- Transfer time is practically zero since inverter is always ON.

Offline UPS:

Diagram:



It contains a transformer, a rectifier and a filter which convert AC into DC. This DC is given to the battery charger which charges the battery.

When the AC main fails the electronic switch takes power from the battery and using inverter converts it into AC to be given to the load. They use a special circuit that senses the ac line current.

If the sensor detects a loss of power on the line, the system quickly switches over to the standby power system (SPS). The SPS transforms the load to the inverter which draws power from the

*Any 2
advantages – ½
M each*

*Offline
UPS –
block
diagram
1M*

*Explana
tion- 2M*



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	attached batteries.	
	Advantages <ul style="list-style-type: none">• Offline UPS has high efficiencies, since charger is not continuously on.• The power handling capacity of charger is reduced.	<i>Any 2 advantages – ½ M each</i>