

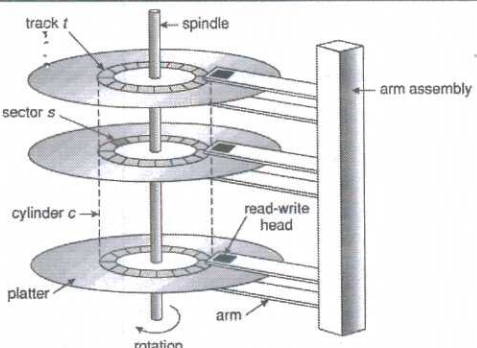
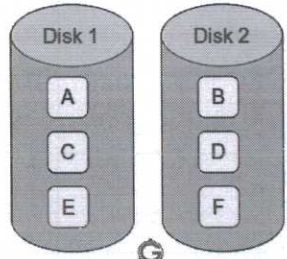
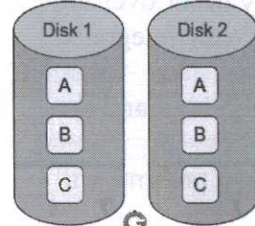
## COMPUTER SYSTEM HARDWARE

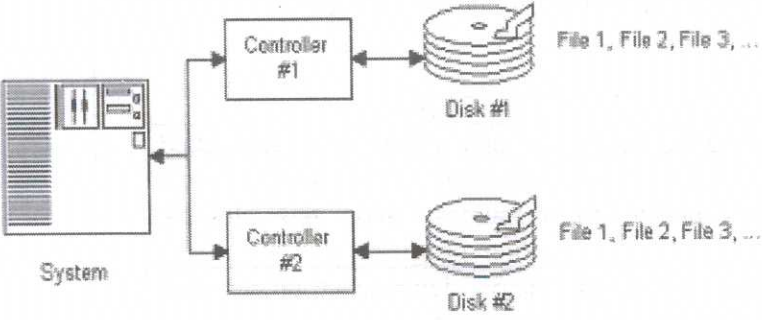
## Scoring Indicators

Qn: No	Key	Split score	Total score
<b>PART - A</b>			
I 1	AT, ATX, Micro ATX, BTX etc Any two	2 x 1 marks	2
I 2	Faster data access, Durable, Consumes less power, No noise while operating Any two	2 x 1 marks	2
I 3	Web cam, Cam coder, MIDI devices, speaker, microphone etc. Any four	4 x 0.5 marks	2
I 4	Finger print recognition, voice recognition, pattern lock, number lock etc. Any two	2 x 1 marks	2
I 5	Laptop, Tablet, Notebook, Netbook, Ultrabook etc. Any two	2 x 1 marks	2
<b>PART - B</b>			
II 1	<p><b>POST (Power On Self-Test):</b> - ensures that the computer has all of the necessary components and functionality needed to successfully start itself.</p> <p><b>Bootstrap Loader:</b> - which search and start the operating system boot program.</p> <p><b>BIOS setup utility Program:</b> - reads the parameters about system configurations from CMOS RAM as and when required</p> <p><b>System service routines:</b> - BIOS provides various software routines that can be called by other software like OS, to perform different tasks</p> <p style="text-align: center;">- Explanation of each</p>	4 x 1.5 marks	6
II 2	<ul style="list-style-type: none"> <li>- SIMM</li> <li>- DIMM</li> <li>- RIMM</li> <li>- SoDIMM</li> <li>- MicroDIMM</li> </ul> <p style="text-align: center;">-Explanation of any two</p>	2 x 3 marks	6
II 3	<p><u>AT/LPX Power Connectors:</u> - AT, Baby-AT, and LPX motherboards use the same type of main power supply connectors. AT/LPX power supplies feature two main power connectors (<b>P8</b> and <b>P9</b>), each with six pins that attach the power supply to the motherboard. The terminals used in these connectors are rated to handle up to five amps at up to 250 V (even though the maximum used in a PC is +12 V).</p> <p><u>ATX and ATX12V Motherboard Power Connectors:</u> - consists of the following three power connectors.</p> <ul style="list-style-type: none"> <li>• 20-pin main power connector</li> <li>• Six-pin auxiliary power connector</li> </ul>		

	<ul style="list-style-type: none"> <li>• Four-pin +12 V power connector</li> </ul> <p>The main power connector is always required, but the other two are optional depending on the application. Consequently, a given ATX or ATX12V power supply can have different four combinations of connectors.</p> <p>- Explanation of any two</p>	2 x 3 marks	6														
II 4	<table border="1"> <thead> <tr> <th>SATA</th> <th>PATA (IDE)</th> </tr> </thead> <tbody> <tr> <td>Serial Advanced Technology Attachment</td> <td>Parallel Advanced Technology Attachment</td> </tr> <tr> <td>Currently in use</td> <td>Out-dated</td> </tr> <tr> <td>Supports Hot plugging</td> <td>Doesn't support hot plugging</td> </tr> <tr> <td>Uses smaller size cable</td> <td>PATA cables are large</td> </tr> <tr> <td>Data transfer rate of up to 600 Mbps</td> <td>Data transfer rate of up to 133 Mbps</td> </tr> <tr> <td>Provision for external interface provided</td> <td>No Provision for external interface</td> </tr> </tbody> </table> <p>Any four differences</p>	SATA	PATA (IDE)	Serial Advanced Technology Attachment	Parallel Advanced Technology Attachment	Currently in use	Out-dated	Supports Hot plugging	Doesn't support hot plugging	Uses smaller size cable	PATA cables are large	Data transfer rate of up to 600 Mbps	Data transfer rate of up to 133 Mbps	Provision for external interface provided	No Provision for external interface	4 x 1.5marks	6
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II 5	<ul style="list-style-type: none"> <li>• Powerful processor</li> <li>• High-end video card</li> <li>• High-end sound card</li> <li>• High-end cooling</li> <li>• Large amounts of fast RAM</li> <li>• Gaming-specific hardware</li> </ul> <p>Brief explanation of each</p>	6 x 1marks	6														
II 6	<p>Mouse- digitizer-Biometric devices- Touch screens- Gamepads and Joysticks</p> <p>Explanation of any two devices</p>	2 x 3 marks	6														
II 7	<ul style="list-style-type: none"> <li>• A <b>docking station</b> is a hardware device that allows portable computers to connect with other devices.</li> <li>• Docking stations enable users with a laptop computer to convert it into a desktop computer.</li> <li>• The docking station typically contains slots for expansion cards, slots for storage devices, and connectors for peripheral devices, such as printers and monitors.</li> <li>• <b>Dock</b> – is the process of connecting a portable computer to a docking station.</li> <li>• <b>Undock (cold dock)</b> is the process of disconnecting a portable computer from a docking station.</li> </ul> <p>Any four points</p>	4x 1.5marks	6														
<b>PART - C</b>																	

III a	<ul style="list-style-type: none"> <li>• Chipsets</li> <li>• Expansion Slots</li> <li>• Memory Slots and external cache</li> <li>• CPU and processor slots or sockets</li> <li>• Power connectors</li> <li>• Onboard disk drive connectors</li> <li>• Keyboard connectors</li> <li>• Peripheral ports and connectors</li> <li>• BIOS chip</li> <li>• CMOS battery</li> <li>• Jumpers and DIP switches</li> <li>• Firmware</li> </ul> <p>Listing of 9 components Explanation of any three components</p>	3 marks 3 x 2 marks	9
III b	<ul style="list-style-type: none"> <li>• CMOS is also a computer chip on the motherboard which retains the data even when the computer is shut down.</li> <li>• CMOS battery is used to provide constant power to the chip.</li> <li>• CMOS RAM is used to store important configuration information.</li> <li>• CMOS keeps current date and time of your system clock, and your computer's boot sequence.</li> <li>• It's a type of non-volatile memory.</li> <li>• CMOS requires little power to hold on to its contents.</li> <li>• CMOS stored information that is required by computer's BIOS.</li> </ul> <p>Any 6 points</p>	6 x 1 marks	6
IVa	<ul style="list-style-type: none"> <li>• SDRAM</li> <li>• DDR</li> <li>• DDR2</li> <li>• DDR3</li> <li>• DDR4</li> <li>• RAMBUS DRAM</li> </ul> <p>Explanation of any three</p>	3 x 3marks	9
IV b	<p>Northbridge:-</p> <ul style="list-style-type: none"> <li>• does the management of high-speed peripheral communication</li> <li>• Is responsible for processor to memory communication (communication between processor and memory occur over the front side bus FSB) and for communications with integrated video using AGP and PCI</li> <li>• Manages the communication between the Southbridge and the rest of the computer</li> <li>• The onboard video circuitry of the motherboard (if present) will be found in the Northbridge.</li> </ul> <p>Southbridge:-</p> <ul style="list-style-type: none"> <li>• Provides support to onboard peripherals (PS/2, IDE ...) and manages their communications with the rest of the computer</li> </ul>	2 x 3marks	6

	<ul style="list-style-type: none"> <li>Manages communication with other expansion buses such as PCI, USB ...</li> </ul>		
<p>V a</p>	 <p>Diagram  Brief Explanation of platter, track and sector  Explanation of working of spindle, read-write head and disk arm</p>	<p>3 marks  3 marks  3 marks</p>	<p>9</p>
<p>V b</p>	<p>SCSI, the Small Computer System Interface allows personal computers (PCs) to communicate with peripheral hardware such as disk drives, tape drives, CD-ROM drives, printers and scanners faster and more flexibly than previous parallel data transfer interfaces. SCSI transfers information at a rate of eight bits per second. The original SCSI standard supports up to 7 devices on a single host adapter, but new standards support high-speed operation with up to 16 devices and bus lengths of up to 12 meters. The bus can handle simultaneous reads and writes.</p> <p>Any four points</p>	<p>4 x 1.5 marks</p>	<p>6</p>
<p>VI a</p>	<p><b>Disk Striping</b> - divides data into blocks of certain size and distributes them over multiple disks. Striping improves I/O performance.</p>  <p><b>RAID 0</b> – Blocks Striped. No Mirror. No Parity.</p> <p><b>Disk Mirroring:</b> - is a storage technique in which the identical copies of data are stored on the RAID members simultaneously. This ensures fault tolerance.</p>  <p><b>RAID 1</b> – Blocks Mirrored. No Stripe. No parity.</p> <p><b>Disk Duplexing:</b> - is an extension of disk mirroring, where data is copied to multiple drives, on different disk controllers. This provides</p>		

	<p>two levels of fault tolerance:</p> <ul style="list-style-type: none"> <li>• If one drive fails, the other contains a mirrored copy of the data.</li> <li>• If one controller fails, the other controller continues to function.</li> </ul>  <p>Brief explanation of three with diagram</p>	3 x 3 marks	9
VI b	<ul style="list-style-type: none"> <li>• <b>Flash memory</b> (Flash Storage) is a type of non-volatile storage memory that can be written in units called “Sector” or a “Block.”</li> <li>• It can retain its contents when the power supply removed.</li> <li>• Its contents can be quickly erased and rewritten at the byte level by applying a short pulse of higher voltage.</li> <li>• It commonly found in mobile phones, USB flash drives, tablet computers, and embedded controllers.</li> <li>• Flash memory is often used to hold control code such as the basic input/output system (BIOS) in a personal computer.</li> <li>• Flash memory is available in two kinds NAND Flash and NOR Flash Memory. NAND and NOR flash memory both have different architecture and used for specific purpose.</li> </ul> <p>Any four points</p>	4 x 1.5 marks	6
VII a	<p>Working</p> <ol style="list-style-type: none"> <li>1. Data Stream from the computer to the printer.</li> <li>2. The printer controller circuit figures out how to print the data correctly on to the printer.</li> <li>3. The controller activates the primary corona.</li> <li>4. The primary corona charges the photo sensitive drum, so that it gets a positive charge uniformly across its surface.</li> <li>5. The controller activates the laser and it draws an image of the page on the drum. Where the laser beam hits the drum, it erases the positive charge that was there and creates an area of negative charge instead. Gradually, an image of the entire page builds up on the drum: where the page should be white, there are areas with a positive charge; where the page should be black, there are areas of negative charge.</li> <li>6. The ink roller coats the drum with toner. The toner is having positive charge. So it only sticks to the parts of the drum having negative charge.</li> <li>7. While the paper is fed by the paper transport it is given a strong positive charge by the transfer or secondary corona.</li> <li>8. When the paper moves towards the drum its positive charge attracts the negatively charged toner particles. Thus the image is transferred from drum to the paper.</li> </ol>		

	<p>9. The inked paper passes through two hot rollers (the <b>fuser unit</b>). The heat and pressure from the rollers fuse the toner particles permanently into the fibers of the paper.</p> <p>10. The <b>printout</b> emerges from the side of the copier.</p> <p>Working step 1 to 9</p>	9 x 1 mark	9												
VII b	<table border="1"> <thead> <tr> <th>Thick Client</th> <th>Thin Client</th> </tr> </thead> <tbody> <tr> <td>Thick clients, also called heavy clients, are full-featured computers that are connected to a network.</td> <td>A thin client is a networked computer with limited local resources and few locally stored programs.</td> </tr> <tr> <td>Thick clients are functional whether they are connected to a network or not.</td> <td>Heavy dependence on network resources.</td> </tr> <tr> <td>A thick client often has more hardware cost</td> <td>A thin client often has low cost hardware</td> </tr> <tr> <td>Thick clients can have programs stored locally. The server may provide the thick client with programs and files that are not stored locally.</td> <td>Zero Clients does not have CPU, RAM and storage.</td> </tr> <tr> <td>Can operate without the server</td> <td>Cannot operate without the server</td> </tr> </tbody> </table> <p>Any four points</p>	Thick Client	Thin Client	Thick clients, also called heavy clients, are full-featured computers that are connected to a network.	A thin client is a networked computer with limited local resources and few locally stored programs.	Thick clients are functional whether they are connected to a network or not.	Heavy dependence on network resources.	A thick client often has more hardware cost	A thin client often has low cost hardware	Thick clients can have programs stored locally. The server may provide the thick client with programs and files that are not stored locally.	Zero Clients does not have CPU, RAM and storage.	Can operate without the server	Cannot operate without the server	4 x 1.5 marks	6
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VIII a	<p><u>CRT (cathode ray tube) monitors:</u> -With these monitors, a stream of intense high energy electrons is used to form images on a fluorescent screen. A cathode ray tube is basically a vacuum tube containing an electron gun at one end and a fluorescent screen at another end. They are heavy, bulky, and costly to replace should they break.</p> <p><u>LCD (liquid crystal display) monitors:</u> - The LCD monitor incorporates one of the most advanced technologies available today. It consists of a layer of color or monochrome pixels arranged schematically between a couple of transparent electrodes and two polarizing filters. Optical effect is made possible by polarizing the light in varied amounts and making it pass through the liquid crystal layer. The advantages of LCD monitors include their compact size which makes them lightweight. They also don't consume much electricity as CRT monitors.</p> <p><u>LED (light-emitting diodes) monitors:</u> - These are flat panel, or slightly curved displays which make use of light-emitting diodes for back-lighting, instead of cold cathode fluorescent (CCFL) back-lighting used in LCDs. LED monitors are said to use much lesser power than CRT and LCD and are considered far more environmentally friendly. They also don't produce much heat while running. They can be more expensive.</p> <p>- Explanation of three</p>	3 x 3 marks	9												
VIII b	<ul style="list-style-type: none"> <li>Common style of connectors found in early computers.</li> </ul>														

	<ul style="list-style-type: none"> <li>• Usually shaped like trapezoid</li> <li>• Can be connected in one orientation</li> <li>• Designated with DXn</li> <li>• X can be A or E denoting the size of the connector</li> <li>• n refers to the number of pins in the connector.</li> </ul> <p>Explanation Examples: DE 9 used for serial port etc</p>	<p>4 marks 2 marks</p>	<p>6</p>
<p>IX a</p>	<p><b>Procedure for Assembling:</b> There are several types of small screws that are used throughout the laptop. Place these in small envelopes and write the component name on the envelope. The first component to install is the processor. <b>Pop in the video card:</b> To install the MXM graphics card, first find the baggie with three larger silver screws and two small black screws. Hold the card at about a 30-degree angle as you insert its edge connector into the video-card slot near the centre of the motherboard. Press the card in and downward and then use the two small black screws to secure it in place. <b>Set up the drive:</b> The motherboard SATA connectors are along the front, right edge, under the lip of the laptop's shell. Drop the drive into place and then carefully use your thumb to push the drive into the SATA connectors. Now use the remaining two screws to secure the drive in place. <b>Add memory:</b> The last internal components to install are the SO-DIMM memory boards. The two memory slots sit between the graphics card and the large silver finned heat sink, near the centre of the motherboard. <b>Final assembly:</b> Now that all the hardware components are installed, find the four screws you removed from the ACE Door, slide the door back into place, and replace the screws. To prepare for power up, pop in the notebook's battery pack, connect the power brick, and plug it into a wall outlet. Finally, open the laptop's cover, cross your fingers on one hand, and use your other hand to press the power button. <b>Procedure for Disassembling</b> Step 1 Unlock and remove the battery. STEP 2. There are six spring-loaded latches securing the keyboard on the top. In order to open up the latch push on it with a small flathead screwdriver. When you push on the latch, it will move inside the case and the keyboard will lift up a little bit preventing the latch from moving back in the locked position. Do the same with all six latches. STEP 3. Lift up the keyboard. Turn it upside down and place on the palm rest. STEP 4. Before you remove the keyboard completely, it's necessary to unlock the connector and release the cable. STEP 5. Slide the cable retainer about 1-2 millimetres to the shown direction. This will unlock the connector. STEP 6. Pull the cable. STEP 7. Remove the keyboard from the laptop.</p>		

	<p>STEP 8. Remove two screws securing the service cover on the bottom. Remove the cover.</p> <p>STEP 9. Under the cover you can access the hard drive, both RAM modules, Wi-Fi card and CMOS battery.</p> <p>STEP 10. Remove one screw securing the optical drive. Slide the optical drive to the left and pull it out of the case.</p> <p>STEP 11. Remove all screws from the bottom.</p> <p>STEP 12. Remove screws securing the top cover (palm rest) assembly. Disconnect the power button cable, touchpad cable and both speaker cables.</p> <p>STEP 13. Unlock and disconnect the power button and touchpad cables the same way you disconnected the keyboard cable.</p> <p>STEP 14. Unplug both speaker cables</p> <p>STEP 15. Start separating the top cover assembly from the bottom case.</p> <p>STEP 16. Remove the top cover assembly.</p>	4 + 5	9
IX b	<p>There are three common types of touch screen technology:</p> <p><b>Resistive:</b> A resistive touch screen monitor is composed of a glass panel and a film screen, each covered with a thin metallic layer, separated by a narrow gap. When a user touches the screen, the two metallic layers make contact, resulting in electrical flow. The point of contact is detected by this change in voltage.</p> <p><b>Capacitive:</b> A capacitive touch screen panel is coated with a material that stores electrical charges. When the panel is touched, a small amount of charge is drawn to the point of contact. Circuits located at each corner of the panel measure the charge and send the information to the controller for processing.</p> <p><b>Surface wave:</b> Surface wave technology uses ultrasonic waves that pass over the touch screen panel. When the panel is touched, a portion of the wave is absorbed. This change in the ultrasonic waves registers the position of the touch event and sends this information to the controller for processing.</p> <p>Listing Brief explanation of any two touch screen technology</p>	2 marks 2 x 2 marks	6
X a	<p><b>Netbooks</b></p> <ul style="list-style-type: none"> <li>• Netbooks are small, lightweight, and inexpensive laptop computers that were introduced in 2007.</li> <li>• They are less powerful and less expensive.</li> <li>• They are designed for power efficiency.</li> <li>• Netbook processors only needs to handle basic computing tasks such as web browsing, email, word processing, spreadsheets, and basic photo editing.</li> <li>• Netbooks use solid state drives for storage.</li> <li>• Their storage capacity generally range from 32GB to 64GB and RAM size of up to 2GB</li> <li>• Netbooks have a display of size 7 inches to 12 inches.</li> </ul> <p><b>Ultrabook</b></p> <ul style="list-style-type: none"> <li>• The ultrabook concept was introduced by Intel.</li> <li>• An Ultrabook is a mini notebook computer.</li> <li>• It is designed to provide similar or superior computing</li> </ul>		

	<p>functionality as that of a standard laptop.</p> <ul style="list-style-type: none"> <li>• But it has less size, weight and an extended battery life.</li> <li>• Ultrabook has a sleek and compact design.</li> <li>• The size of the display screen varies from 11 to 14 inches.</li> <li>• Ultrabook provides a battery back up of 5 to 12 hours.</li> <li>• Ultrabooks are faster when compared to laptops.</li> <li>• They use solid state drives for storage.</li> <li>• Ultrabooks usually have a USB 3.0 port to ensure a fast data transfer rate.</li> </ul> <p><b>Tablet PC</b></p> <ul style="list-style-type: none"> <li>• A <b>tablet, tablet computer, or tablet PC</b> is a mobile computing device designed to be held in one or two hands.</li> <li>• It has typically the size of a book (seven inches or bigger) and resemble a large smartphone.</li> <li>• Display screen size varies from 7 to 10 inches.</li> <li>• all tablets use a touch screen as their primary input device.</li> <li>• They will have an option to connect external devices such as a keyboard.</li> <li>• The top two operating systems used with tablets is Apple iOS used with iPads and Google Android used with Android tablets.</li> <li>• A tablet can have apps installed onto them to perform a function.</li> <li>• Tablet PCs have built-in Web browsing capabilities, multiple connectivity options, capacitive touch screens and multimedia - including high definition (HD) support.</li> <li>• Tablet PCs are also equipped with accelerometers, which allow users to view display screens in portrait or landscape mode.</li> </ul> <p>Features</p>	3 x 3 marks	9
X b	<p><b>PCMCIA</b> - PCMCIA has developed a standard for small, credit card-sized devices, called PC Cards. PC cards are designed for adding memory to portable computers.</p> <p><b>Mini PCI</b> - Mini PCI is a subset of the PCI interface that uses a significantly smaller card form factor. Supporting only 3.3 volts and 32 bits of the PCI specification, Mini PCI was designed for peripherals such as network adapters in laptops.</p> <p><b>USB - USB stands for universal Serial Bus: -</b></p> <ul style="list-style-type: none"> <li>• <b>USB</b> is a plug and play interface that allows a laptop to communicate with peripheral and other devices.</li> <li>• USB can be used to connect a wide range of devices to a laptops;</li> <li>• USB may also be used to send power to certain devices, such as smartphones and tablets, as well as charge their batteries.</li> </ul> <p><b>ExpressBus: -</b> one side of the ExpressBus hub has four to seven USB port and the other side can be plugged on to the USB port of the laptop via special USB A/B cable. These hubs can be daisy chained to support up to 127 devices.</p> <p><b>Communication Port: -</b> can have infrared, cellular, Bluetooth or Ethernet ports to provide various means of communication.</p> <p>Explanation of any two</p>	2 x 3 marks	6