# Unit 2

# Input Devices and Data Storage

## -14 Marks

**Q-A Objective Type Questions (1 mark of each).**

1. Full form of MICR **Magnetic Ink Character Recognition.**
2. Which keyboards are generally different from other with respect to special key?
   - **Laptop keyboards**
3. Give full form of POS **Point of Sale.**
4. Who invented mouse?
   - **Duglas Englebart**
5. OMR Stands for **Optical Mark Recognition**.
6. Which scanners are NOT accurate in order to scan some image?
   - **Hand Scanner**
7. OCR Stands for **Optical Character Recognition**.
8. Magnetic tape is not a primary storage device **True.**
9. DVD Stands for **Digital versatile Disk.**
10. The total time to reach under specific sector is known as **Access time.**

**Q-B Attempt the Questions (2 mark of each).**

1. **What is cluster?**
   - A computer cluster is a set of loosely or tightly connected computers that work together so that, in many respects, they can be viewed as a single system. Unlike grid computers, computer clusters have each node set to perform the same task, controlled and scheduled by software.
2. **What is DVD?**
   - DVD stands for Digital Versatile Disk. DVD is an optical disc Technology with 4.7 gigabytes storage capacity on a single sided one layered disk, which is enough for a 133 minute movie of original size of almost 4 to 5 movies of law format.
   - There are 5 types of DVDs
   - DVD-R
   - DVD-RW
   - DVD+R
   - DVD+RW
   - DVD-RAM

3. **What is Input Device?**
   - Input devices are peripherals that allows data to be captured and transmitted to the computer system the data from outside the system is not only usually in computer readable form and therefore one of the major task of input devices is to convert data into electrical pulses suitable for computer processing.
   - All input peripheral devices perform the following functions
     - Accept the data and instruction from the outside world
     - Convert it to a form that the computer can understand
     - Supplied that converted data to the computer system for further processing
4. **What is seek time?**
   - first of all the head gets the address of file be loaded or stored after reading the address of specific data the head takes its position under specific track the time taken to reach the head under specific factor is known as seek time
   - The data on the media is stored in sectors which are arranged in parallel circular tracks there is an actuator with an arm that suspend ahead that can transfer data with that media when the drive needs to read or write a certain sectors it determines in which track the sector is located it is the uses the actuator to move the head to that particular track.
5. **What is graphics tablet?**
   - A graphics tablet is a computer input device that enables a user to hand-draw images, animations and graphics, with a special pen-like stylus, similar to the way a person draws images with a pencil and paper. These tablets may also be used to capture data or handwritten signatures. It can also be used to trace an image from a piece of paper which is taped or otherwise secured to the tablet surface. Capturing data in this way, by tracing or entering the corners of linear poly-lines or shapes, is called digitizing.
   - The device consists of a flat surface upon which the user may "draw" or trace an image using the attached stylus, a pen-like drawing apparatus. The image is displayed on the computer monitor, though some graphic tablets now also incorporate an LCD screen for a more realistic or natural experience and usability.
6. **What is MIC (Microphone)?**
   - A microphone, colloquially named MIC or mike is a device a transducer that converts sound into an electrical signal. Microphones are used in many applications such as telephones, hearing aids, public address systems for concert halls and public events, motion picture production, live and recorded audio engineering, sound recording, two-way radios, megaphones, radio and television broadcasting, and in computers

for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic sensors or knock sensors.

- Several types of microphone are in use, which employ different methods to convert the air pressure variations of a sound wave to an electrical signal. The most common are the dynamic microphone, which uses a coil of wire suspended in a magnetic field; the condenser microphone, which uses the vibrating diaphragm as a capacitor plate; and the piezoelectric microphone, which uses a crystal of piezoelectric material. Microphones typically need to be connected to a preamplifier before the signal can be recorded or reproduced.

**7. What is wireless keyboard and mouse?**

- A wireless keyboard is a computer keyboard that allows the user to communicate with computers, tablets, or laptops with the help of radio frequency (RF), infrared (IR) or Bluetooth technology. It is common for wireless keyboards available these days to be accompanied by a wireless mouse.
- Wireless keyboards based on infrared technology use light waves to transmit signals to other infrared-enabled devices. But, in case of radio frequency technology, a wireless keyboard communicates using signals which range from 27 MHz to up to 2.4 GHz. Most wireless keyboards today work on 2.4 GHz radio frequency. Bluetooth is another technology that is being widely used by wireless keyboards. These devices connect and communicate to their parent device via the Bluetooth protocol.
- A wireless keyboard can be connected using RF technology with the help of two parts, a transmitter and a receiver. The radio transmitter is inside the wireless keyboard. The radio receiver plugs into a keyboard port or USB port. Once the receiver and transmitter are plugged in, the computer recognizes the keyboard and mouse as if they were connected via a cable.

**8. Define Floppy Disk and Hard Disk.**

- **Floppy Disk:** A floppy disk, also known as a floppy, diskette, or simply disk, is a type of disk storage composed of a disk of thin and flexible magnetic storage medium, sealed in a rectangular plastic enclosure lined with fabric that removes dust particles. Floppy disks are read and written by a floppy disk drive (FDD).
- **Hard Disk:** A hard disk drive (HDD), hard disk, hard drive, or fixed disk is an electro-mechanical data storage device that uses magnetic storage to store and retrieve digital data using one or more rigid rapidly rotating platters coated with magnetic material. The platters are paired with magnetic heads, usually arranged on a moving actuator arm, which read and write data to the platter surfaces. Data is accessed in a random-access manner, meaning that individual blocks of data can be stored and retrieved in any

order. HDDs are a type of non-volatile storage, retaining stored data even when powered off.

**9. Define magnetic tape.**

- Magnetic tape is a medium for magnetic recording, made of a thin, magnetisable coating on a long, narrow strip of plastic film. It was developed in Germany in 1928, based on magnetic wire recording. Devices that record and playback audio and video using magnetic tape are tape recorders and video tape recorders respectively. A device that stores computer data on magnetic tape is known as a tape drive.

**10. What are tracks and Sectors?**

- When a disk undergoes a low-level format, it is divided into tracks and sectors. The tracks are concentric circles around the disk and the sectors are segments within each circle. For example, a formatted disk might have 40 tracks, with each track divided into 10 sectors.

**11. What is flash memory?**

- Flash memory is an electronic (solid-state) non-volatile computer memory storage medium that can be electrically erased and reprogrammed. The two main types of flash memory are named after the NAND and NOR logic gates. The individual flash memory cells, consisting of floating-gate MOSFETs, exhibit internal characteristics similar to those of the corresponding gates.

**Q-C Attempt the Questions (3 mark of each).**

**1. Explain types of optical storage device.**

- Optical storage electronic storage medium that uses low-power laser beams to record and retrieve digital (binary) data. in optical –storage technology a laser beam encodes digital data onto an optical or laser disk in the form of tiny pits arranged in concentric tracks on the disk surface. A low power laser scanner is used to read these pits with variations in the intensity of reflected light from the pits being converted into electric signals
- This technology is used in compact disk which records sounds in the CD-ROM which can store text and images as well as sound in WROM a type of disk that can be written on once and read any number of times and in never disks that are totally rewritable.
- you can also say CD drive, DVD drive or Blue ray disc drive all of this use lesser bean as a storage mechanism with Different techniques of storing data optical disc drives are an integral part of standalone consumer appliances such as a CD player, DVD player and DVD recorder there also very commonly used in computer to read software and consumer media distributed on disc and to record is for archival and data exchange purposes
- If we talk about current technologies in optical disk storage there are various storage media available in optical storage

- CD( compact disc)
- DVD (digital versatile disc)
- Blue ray disc

**2. Explain any two input device.**

- **Track ball :** A trackball is pointing device consisting of ball held by a socket containing sensors to detect rotation of the ball about to axis like an upside down mouse with an exposed protruding ball the user rolls the ball with the thumb, fingers or the palm of the hand to move a pointer.
- The traditional mouse required that the user to perform three task at once the user must grasp the mouse move the mouse and click the mouse button at the same time.
- Three major companies LogiTech, A4tech and Kensington currently produce trackballs.
- trackball in mobile now: some mobile phones have trackball including those in the Blackberry range the T-mobile sidekick 3 and most HTC smart phones these miniature trackballs are made to fit within the thickness of a mobile device and are controlled by the tip of a finger or thumb.
- **POS (Point Of Sale):** if you have been visited any of the supermarket or Mall you will be able to understand POS immediately.
- when you buy anything from the supermarket or Mall at the end of your shopping you go to counter where you pay the bill the person which is standing at the cash counter scans your goods with a special machine called barcode reader machine also has monitor and printer connected with barcode reader after whole scanning id done person at counter opens a drawer and keep the cash given by you. If you don't have cash you can also give also pay with help of credit card or debit card or any other type of card his whole mechanism and the process of selling is known as POS (point of sale).

**3. What is camera? Explain their categories in brief.**

- Camera can be called as picture talking device. various type of camera exists which are used for either talking pictures, taking videos or for chatting while using internet or similar type of facility like online video conference.
- in general camera can be categorized into 3 ways
  1. Digital camera / Dig cam
  2. Video Camera /Camcorder /Handy cam
  3. Web camera /CCTV Camera

**1) Digital camera / Dig cam**

- A digital camera is most popular among all type of cameras because this is a mostly used device which can be used to take different pictures digital camera can store images digitally rather than recording them on film Once a picture has been taken it can be downloaded to computer system and then menipulated with graphic program and printed

- Although digital camera can be used to record video as well as take still photograph but its main function is to take digital photographs and then store it in computer today most of the digital cameras allowed video shooting also but that but it does not have proper resolution or proper sound effect which can be obtained from video camera.

**2) Video Camera /Camcorder /Handy cam**

- one small limitation of most of digital camera today most of the digital camera can shoot video but the resolution is not of film quality apart from that they definite have sound issues. video camera were initially invented for film and Television industry in order to record movies or plays with high resolution we often call a small video camera as camcorder and a bigger one as video camera the term camcorder comes from Camera Recorder.
- Camcorder: The majority of devices that are capable of recording video are camera phones and digital cameras primarily intended for still picture, but the term camcorder is often restricted to mean portable, self-contained device having video capture and recording as its primary function.
- Video Camera: these types of cameras are used for high density film shooting which can be used in television production, film making and digital camera. Video cameras are used where the camera feeds real time image directly to a screen for immediately observation.
- Camcorder contains three major components: lens, image and recorder.

**3) Web camera /CCTV Camera**

- A webcam is a video camera that feeds its images in real time to a computer or computer network, often via USB, Ethernet or Wi-Fi. A webcam is essentially just a camera that is connected to a computer, either directly or wirelessly and gathers a series of images for remote display elsewhere. Webcam technology is widely used by all sorts of people for all sorts of different reasons.
- Close-circuit television camera is also a type of web cam but they are mostly connected to some external device or may be TV which can be used to view live motions.

**4. Explain cloud storage.**

- Cloud Storage is a service where data is remotely maintained, managed, and backed up. The service is available to users over a network, which is usually the internet. It allows the user to store files online so that the user can access them from any location via the internet. The provider company makes them available to the user online by keeping the uploaded files on an external server. This gives companies using cloud storage services ease and convenience, but can potentially be costly. Users should also be aware that

backing up their data is still required when using cloud storage services, because recovering data from cloud storage is much slower than local backup

- Usability – All cloud storage services reviewed in this topic have desktop folders for Mac's and PC's. This allows users to drag and drop files between the cloud storage and their local storage.
- Bandwidth – You can avoid emailing files to individuals and instead send a web link to recipients through your email.
- Accessibility – Stored files can be accessed from anywhere via Internet connection.
- Disaster Recovery – It is highly recommended that businesses have an emergency back-up plan ready in the case of an emergency. Cloud storage can be used as a back-up plan by businesses by providing a second copy of important files. These files are stored at a remote location and can be accessed through an internet connection.
- Cost Savings – Businesses and organizations can often reduce annual operating costs by using cloud storage; cloud storage costs about 3 cents per gigabyte to store data internally. Users can see additional cost savings because it does not require internal power to store information remotely.

**5. Explain light pen and joystick.**

- **Light pen:** Alight pen is a pointing device. It used to select and write the text on the CRT. It is a photosensitive pen like device. It is capable of sensing a position on the CRT screen when its tip touches the screen.
- when its tip is moved over the screen surface, its photocell-sensing element detects the light coming from the screen and corresponding signals are sent to the processor. The menu is a set of programmed choices offered to the user.
- Light pens give the user the full range of mouse capabilities without the use of a pad or any horizontal surface. Users can interact more the application, in such modes as drag and drop or highlighting.
- **Joystick:** A Joy stick is also pointing device. It is used to move the cursor position on a CRT screen. Its function is similar to that of a mouse. It is a stick, which has spherical ball socket. The joy stick can be moved right or left, forward and backward. The position is sent to the processor. Joy stick is mainly used for playing 3D games.

  Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer. A popular variation of the joystick used on modern video game consoles is the analog stick.

**Q-D Attempt the Questions (5 mark of each).**

1. **Explain DVD and blue ray disk.**
   - **DVD(Digital Versatile Disk):** DVD digital versatile disc DVD is an optical disc Technology with a 4.7 gigabytes storage capacity on a single sided one layered which is enough for a 133 minute movie of original size for almost 4 to 5 movies of flow format
   - DVD can be single or double sided and can have two layers on each side a double sided to layered DVD will hold up to 17 gigabytes of video, audio, or other information is computer to 650 megabyte Storage for a CD ROM disk.
   - The DVD specification supports disk with capacities of from 4.7 GB To 17 GB rates of 600KBps to 1.3MBps.
   - One of the best features of DVD drives is that they are backward compatible with CD ROM meaning they can play old CD-ROMs, CD-I disk and video CDs as well as new DVD-ROMs.
   - DVD uses the MPEG2 file and compression standard MPEG2 images four times the resolution of MPEG1 images and can be delivered at 60 interlaced fields per second where two fields constitute one image frame audio quality on DVD is comparable to that of current audio compact discs.
   - There are 5 types of DVDs
     - DVD-R
     - DVD-RW
     - DVD+R
     - DVD+RW
     - DVD-RAM
   - **Blu-Ray Disk: Blu-ray**, is a digital optical disc data storage format. It was designed to supersede the DVD format, and is capable of storing several hours of video in high-definition (HDTV 720p and 1080p). The main application of Blu-ray is as a medium for video material such as feature films and for the physical distribution of video games for the PlayStation 3, PlayStation 4, and Xbox One. The name "Blu-ray" refers to the blue laser (which is actually a violet laser) used to read the disc, which allows information to be stored at a greater density than is possible with the longer-wavelength red laser used for DVDs.
   - The plastic disc is 120 millimetres (4.7 in) in diameter and 1.2 millimetres (0.047 in) thick, the same size as DVDs and CDs. Conventional or pre-BD-XL Blu-ray Discs contain 25 GB per layer, with dual-layer discs (50 GB) being the industry standard for feature-length video discs. Triple-layer discs (100 GB) and quadruple-layer discs (128 GB) are available for *BD-XL* re-writer drives.

- High-definition (HD) video may be stored on Blu-ray Discs with up to 1920×1080 pixel resolution, at 24 progressive or 50/60 interlaced, frames per second. DVD-Video discs were limited to a maximum resolution of 480p or 576p. Besides these hardware specifications, Blu-ray is associated with a set of multimedia formats.

**2. Explain type of magnetic storage device.**

- magnetic disk drives comprise of one or more circular rotating disks coated with magnetic material that is used for the recording of data
- Data is stored And retrieved from the disk using a conducting coil called the head during a read/write the head is stationary while the platter rotates beneath it
- there are majorly two types of magnetic disk storage floppy disk and hard disk the storage mechanism and retrieval mechanism of both are almost same the only difference between them is floppy disk has only one circular disc of plastic material where is hard disc has more than one metal plates which are coated with iron material apart from that storage method in floppy disk and hard disc is almost identical
- before going through in detail of floppy disk and hard disk it is important to understand the storage mechanism of floppy disk and hard disk let us go through some important definitions which will help you to not how the data is store on floppy disks as well as hard disks.
- the important address related terms which are important to know are track, sector, cylinder and FAT
- **Track**: A disk drive track is a circular path on the surface of a disk or diskette on which information is magnetically recorded and from which recorded information is read. A track is a physical division of data in a disk drive, as used in the Cylinder-Head-Record (CCHHR) addressing mode of a CKD disk.
- **Sector**: In computer disk storage, a sector is a subdivision of a track on a magnetic disk or optical disc. Each sector stores a fixed amount of user-accessible data, traditionally 512 bytes for hard disk drives (HDDs) and 2048 bytes for CD-ROMs and DVD-ROMs. ... The sector is the minimum storage unit of a hard drive.
- **Cylinder**: Cylinder Definition. A cylinder is any set of all of tracks of equal diameter in a hard disk drive (HDD). It can be visualized as a single, imaginary, circle that cuts through all of the platters (and both sides of each platter) in the drive

- **FAT**: File Allocation Table. ... File Allocation Table (FAT) is a computer file system architecture and a family of industry-standard file systems utilizing it.

**3. What is keyboard? Explain different types of keyboard.**

- keyboard is a device which has several keys to input programs and data entered into a computer through a keyboard which is attached to a microcomputer or the terminal of mini or large computer keyboard is a similar to the typewriter it contains alphabets, digits, special characters and some control keys.
- A standard keyboard has various type of keys
  - **Alphanumeric keys:** Alphabetical, numeric and punctuation keys are used in the same fashion as a typewriter keyboard to enter their respective symbol into word processing, Program, text editor, data spreadsheet or other program. alphanumeric A to Z, a to z, 0 to 9
  - **Special symbol key:** apart from alphanumeric keys keyboard have some special keys with special symbol like.
  - **Control keys:** some keys are used for special type of control generally used along with some shortcut keys.
  - **Function keys:** function keys have inbuilt function which are already provided some function keys are dedicated to operating system and may work depending on the software you are using.
  - **Navigation keys:** some keys are always used for navigation. Navigation means moving from one part to another of your document.
  - **System command key:** some special keys are dedicated to operating system
  - **Special keys:** some special type of keyboard has some additional keys.
- In general we know general keyboard which is attached to a computer or you are aware about a laptop keyboard fondant current available with his discuss.
- In general we know general Keyboard which is attached to computer or maybe you are aware about a laptop keyboard which is generally smaller than a routine keyboard apart from that different types of keyboard available which are discussed here

**1) computer keyboard**

- It is always preferred to use computer keyboard because most of keys are placed on the same position no matter what keyboard is

of which company it helps you to type faster and has standard keys which are common to all.

2) **laptop keyboard**
   - The laptop computer keyboard is a small version of the typical QWERTY keyboard. A typical laptop has the same keyboard type as a normal keyboard except for the fact that most laptop keyboard condense symbol into favour button to accommodate less space

3) **numeric keyboard**
   - numeric keyboard are specially meant to deal with numeric digits banking sector takes maximum advantage of numeric keyboard it has all the keys which are almost similar to calculator the reason behind using numeric keyboard is type numbers in a faster way

4) **gaming keyboard**
   - Gaming keyboards are similar to normal keyboard except they generally contain extra features such as illuminated keys, multimedia keys and additional LCD screen, palm rest and other features.

5) **roll up keyboard**
   - Roll up computer keyboard are extremely good for travelling simply role of them and then unroll them when you need them again typically the material is either silicone or polyurethane these device are meant to be roll up.

**4. What is mouse? Explain in brief.**

- A mouse is a device that controls the movement of the cursor pointer on a display screen a mouse is a small object you can roll along a hard flat surface
- A mouse is also called as a pointing device it is held in one hand and moved across a flat surface with the help of tracking ball its movement and the direction of the movement is detected by two rotating wheel on the underside of the mouse called sensor.
- Some common functions of mouse can be discussed
  - **Pointing**: You can move mouse along your screen in order to point out any object.
  - **Moving**: Mouse may be just used to move around the screen you move the mouse in order to take it from one place to another place.

- **Clicking**: clicking includes a small action on mouse. You first move your mouse pointer on particular object and then press the mouse button and release it.
- **Double-clicking**: Once you click on mouse TWICE immediately once after another it's termed as double-clicking.
- **Dragging**: while using computer we may need to transfer file from one place to another place on screen we also need to transfer some file from one folder to another folder in order to go for any moment operation we need to drag the mouse when we drag the mouse we select some object on screen and then move the mouse by pressing left button which moves the object along with mouse

➢ Let us discuss types of computer mouse

**1) Mechanical Mouse**

➢ this is the traditional Mouse which we used since it was introduced by Duglas Englebart this is a type of computer mouse that has a rubber or metal ball underside and it can roll in every direction the rubber which is inside the mouse is known as track ball.

**2) Optical mouse**

➢ is the use of optical mouse is similar to the mechanical Mouse the only difference in optical mouse is it does not have any track ball system its movement is detected by an LED which is kept at the underside or you can say it the bottom side of the mouse

**3) Laser Mouse**

➢ laser Mouse uses special laser beams to detect the position of mouse it uses a lesser to detect the mouse's moment

**4) Cordless mouse**

➢ these are not physically connected to the computer rely on infrared or radio waves to communicate with the computer cordless are more expensive than both the serial and bus Mouse the nice thing is that there is no cord to constrain or get in your way

**5) 3D Mouse**

➢ this type of mouse are used in order to move some object or in order to play games as gaming device generally all above

Mouse operate on only 2 degrees forward-backward and left-right 3D Mouse provide at least 3 degree of freedom

**5. Explain Scanner in brief.**

- scanners are kind of input devices they are capable of entering information directly into the computer The main advantage of direct entry of information is that user do not have any key the information and another advantage is that through scanners you can input graphical data into the computer this provides faster and more accurate data entry
- let us go through different types of scanner as per the usage category we can divide scanner into following categories

**1) Drum scanner**

- Drum scanners are bigger in size which are used to scan high resolution images drum scanner capture image information using photomultiplier tube Technology in drum scanner light from the original artwork is split into separate red, blue and green beams in the optical bench of the scanner making the digital image more precise

**2) flatbed scanner**

- flatbed scanner are smaller than drum scanner these are the most common scanner which are used in routine computer industries for scanning purpose graphical scanner, OMR, OCR, MICR can be categorized under flatbed scanner

**3) hand scanner**

- hand scanner are the smallest in size which can be handled or operated through free hands this means they don't require any specific stand in order to keep them hand scanner is a manual device that is dragged across the surface of the image to be scanned.
- let us discuss different types of scanner

**1) Graphical scanner**

- Graphical scanners come in a variety of Style including flatbed sheet fed pad and dedicated photo scanner which come with specialized software to help you to scan and restore photos.
- graphical scanners are also known as photo scanner which are generally used to scan photos no matter what kind of photos you work with or whether you are professional photographer or just have some old photos you would like to restore and save photo scanners can make things easy for you

**2) OBR (optical barcode recognition)**

- A barcode is a small image with thick and thin lines along with some numbers beneath it. Originally barcodes represented by varying the widths and spacing of parallel lines. Previously bar codes were also known as UPC (Universal Product Code) but letter on it replaced with barcode because it contains a group of bar lines in order to represent some data.
- Every day you see in the world around you. The code uses a sequence of vertical bears and spaces represent numbers and other symbols. A barcode symbol typically consists of five parts: a quiet zone, a start characters, a data character and another quiet zone
- Barcode can be used in every business around the world

**3) OMR (optical mark recognition)**

- optical mark recognition also called mark reading through the technology of OMR a simply and reasonable method of entering data by document into computer system is enable OMR is one of the fastest and safest method for data entry into host until today
- Some advantage of OMR technology is simplicity functionality and speed
- Today Technology has spread all over but it is mainly used for following purpose
- examination at school college and university
- public opinion polls
- assessment test
- counting of votes
- Staff opinion survey

**4) OCR (optical character recognition)**

- Optical character recognition, or OCR, is a technology that enables you to convert different types of documents, such as scanned paper documents, PDF files or images captured by a digital camera into editable and searchable data.
- Let's take a look on how Fine Reader OCR recognizes text. First the program analyzes the structure of documents image. It divides the page into elements such as blocks of texts, tables, image, etc. The lines are divided are into words and then-into characters.
- once the characters have been singled out the program compare them with a set of pattern images it advances numerous hypotheses about what this character is basing on these hypotheses the program analyze

different variants of breaking of lines into words and words into characters after processing using number of such document the program finally takes the decision presenting you the recognized text.

5) **MICR (magnetic ink character recognition)**

- magnetic ink character recognition Technology helps you to read character which are written with the help of special ink called Magnetic ink MICR is character recognition technology used primary by the banking industry to facilitate the processing of cheques and make up the routing number and account number at the bottom of a check
- MICR characters are printed in specific typefaces with magnetic ink or toner usually containing iron oxide. as a machine decodes the MICR test it first magnetizes the characters in the Plane of the paper then the characters are passed over a MICR read head device similar to the playback head of tape recorder each character passes over the head it produce a unique waveform that can be easily identified by the system.