MODEL ANSWER

SUMMER– 17 EXAMINATION

Subject Title: Video Engineering **Subject Code:** 17668

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 anyequivalent 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
Q.1	(A)	**Attempt any THREE :**	12-Total Marks
	(i)	**State the feature of JPEG 2000 video compression technique.**	4M
	Ans:	1) It used discrete wavelet transformation Or DWT 2) Compression performance is at low bit-rate 3) Lossless and lossy compression is performed with a single code stream. 4) It is applicable for both gray and color images. 5) Flexible file format. 6) Progressive transmission by pixel and resolution accuracy. 7) High compression ratio(about 20% more than JPEG) 8) Its flexible to decoded in number of ways 9) Its application is in multimedia, medical imagery, remote sensing, military surveillance.	(Any four:1M for each)
	(ii)	**Define Pay TV. State the need of scrambling and descrambling.**	4M
	Ans:	**Pay TV:** The cable companies offer several local TV program for a minimum charge in addition premium services on separate channels are offered which include cine-films, special sport events and many more.	(Definition: 1M, Need of scrambling: 2M, descrambling:1M)

Need of Scrambling:

However, these premium channels require a fee to be paid that is added to the basic charge. For this the incoming signal is scrambled i.e. picture is an intelligible on the receiver screen unless de-scrambled i.e. restored to its normal form with a signal supplied by the cable operator at the subscriber request with additional payment.

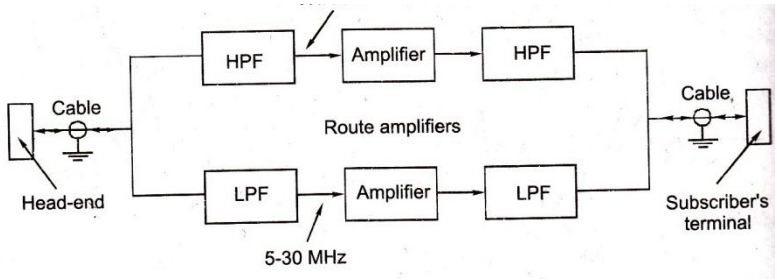
The most common method of scrambling signal is known as sync separation. in this sync is only compressed in the RF modulation envelope of the video carrier in the cable channel then the receiver cannot lock in with the sync suppressed signal and the picture continuously rolls with horz tearing of its details .

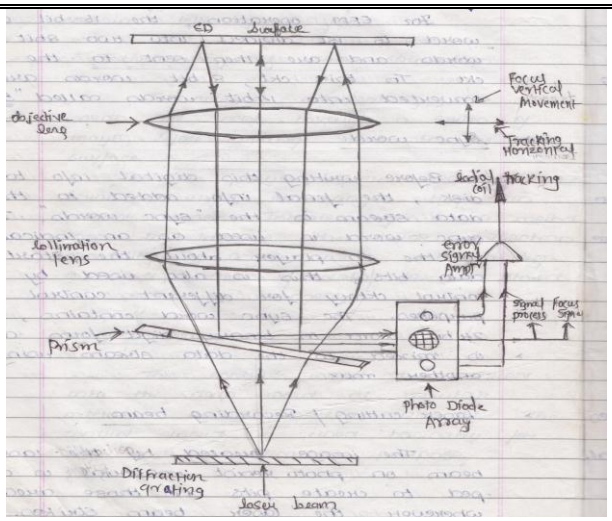
Need of Descrambling:

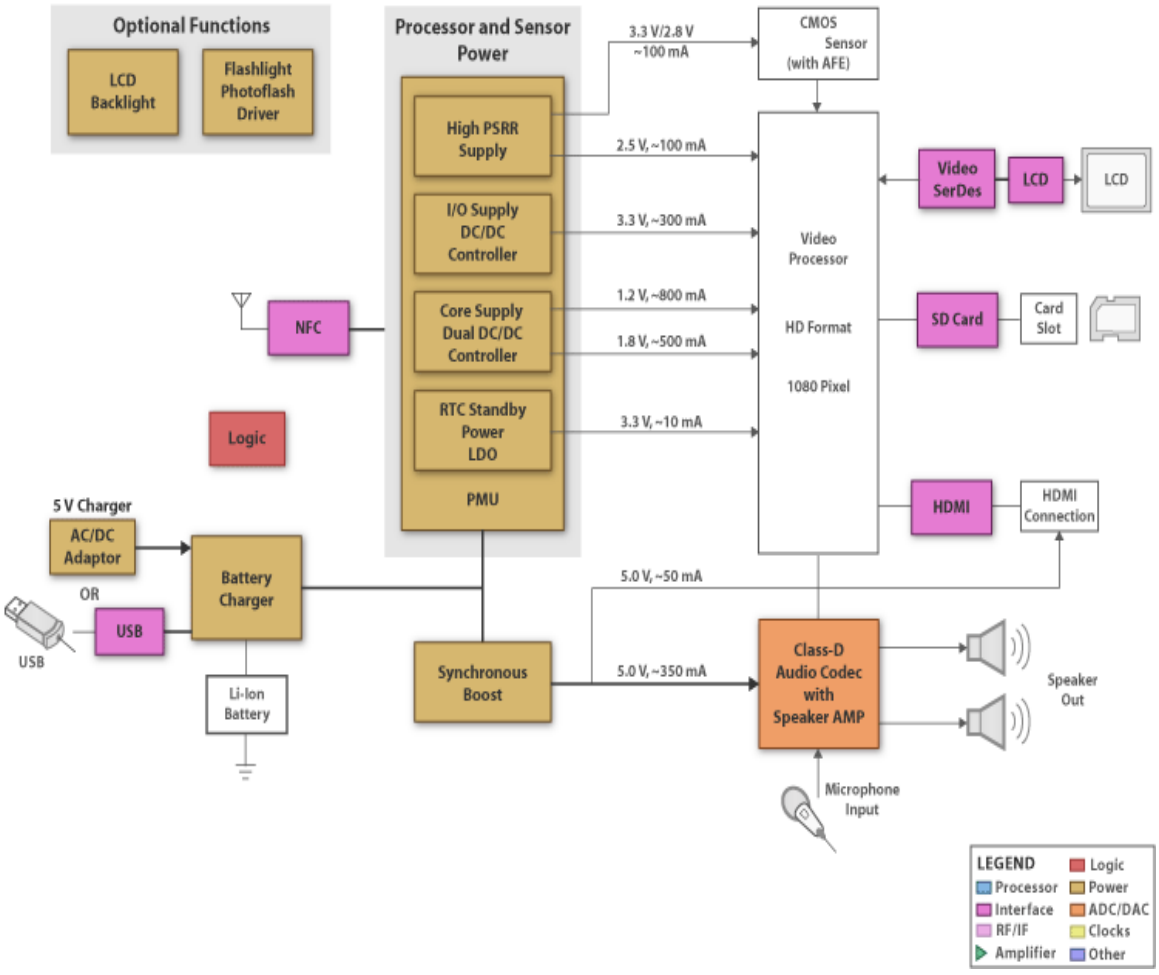
The descrambler unit reverses the effect of scrambling at the head end of the cable system by restoring sync to the RF signal.

(iii)	**State different motors used in DVD player. State functions of any two.**	**4M**
Ans:	Name of different motor used in DVD player are as follows:- 1. Tray, Loading, Carriage Motor 2. Slide, Sled, Feed Motor 3. Spindle ,Disc, Turntable Motor Functions: • Tray, Loading, Carriage Motor pushes out and pulls in the VCD tray when the open/close switch is pressed. • The slide, feed or sled motor moves the optical pickup unit from the center to outer edge of the disk on sliding rods. • A disc, spindle, or turntable motor rotates the VCD at a variable speed. The disc motor rotates faster at the beginning and slows down as the laser assembly moves toward the outer edge of the VCD.	**(List: 1M, Functions: 1.5M for each)**
(iv)	**Compare DVD and BD on the basis of (a) Laser operating wavelength (b) Data storage/capacity per layer (c) compression technique.**	**4M**
Ans:		**(for A-1M, B-1.5M,C-1.5M)**

SR.NO.	ITEM	DVD	BD
A	Laser operating wavelength	Red laser(650 nm)	Blue-violet laser (405 nm)
B	Data storage/capacity per layer	4.7 GB	25 GB
C	Compression technique	MPEG-2	MPEG-2 and MEPG-4/H.264

B)	**Attempt any ONE :**	**6M**
(i)	**Draw the block diagram of two-way cable systems and illustrate function of each block.**	**6M**
Ans:	**Diagram:**  	**3M**
	Explanation: • In addition to downstream signal from head end to each subscriber most cable system are designed for bidirectional i.e. Two way service; where the same cable is used for both directions. • However separate amplifiers are used for upstream signals as shown in Fig. towards the head end, communication is in the 5-30 MHz band while the downstream transmission, to subscriber is around 50 MHz or higher. As shown in fig. directional H.P & L.P filters are used to keep the two paths dependent of each other. • Two way application- The two way CATV system, enables communication with subscriber. • For billing, market surveys shop at home service and pay per view for special programmers. Some city service origination, permit home bungalow & security systems to be connected to a central receiving station in the return line of the cable system.	**3M**
(ii)	**With the help of neat diagram, show how optical arrangement in three beam linear tracking pick-up assembly is used.**	**6M**
Ans:	**Diagram:**	

			**3M**
		Explanation: • This type of optical assembly is used in the most of the current VCD players. In these units ,three laser beams are generated from a main laser beam ,the main or center beam provides data retrieval as well as focus error information and two side beams provide tracking error signal. • In this assembly the objective lens can move vertically to achieve focus, and laterally (horizontally) for tracking, i.e. to move to the center of track. • In this assembly, the laser diode produces only one laser beam, other two beams are obtained from this single beam by using a diffraction grating. • As the lens has limited amount of lateral movement, the complete assembly is moved gradually across the surface of the disc to read the signal on the VCD surface.	**3M**
Q 2		**Attempt any TWO:**	**16M**
	(i)	**Illustrate the working of camcorder with help of block diagram.**	**8M**
	Ans:	**Diagram:**	**(Diagram: 4M, Working: 4M)**

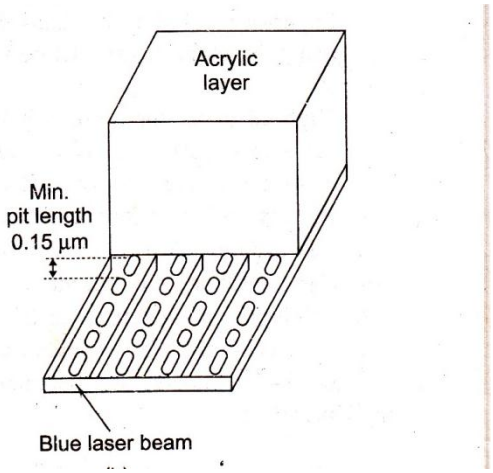


- The imager (usually a CCD or CMOS)sensor converts incident light into an electrical signal. The imager converts light into an electrical signal. The camera lens projects an image onto the imager surface, exposing the photosensitive array to light. This light exposure is converted into an electrical charge. At the end of the timed exposure, the imager converts the accumulated charge into a continuous analog voltage at the imager's output terminals. After the conversion is complete, the photosites reset to start the exposure of the next video frame.
- The recorder converts the electrical signal to video, encoding it in a storable form. The lens and imager comprise the "camera" section.
- The recorder writes the video signal onto a recording medium, such as magnetic videotape.
- All camcorders have a recorder-controlling section, allowing the user to switch the recorder into playback mode for reviewing recorded footage, and an image-control section controlling exposure, focus and color balance.
- Signal processing unit does analog to digital conversion, automatic focus, contrast and data compression.

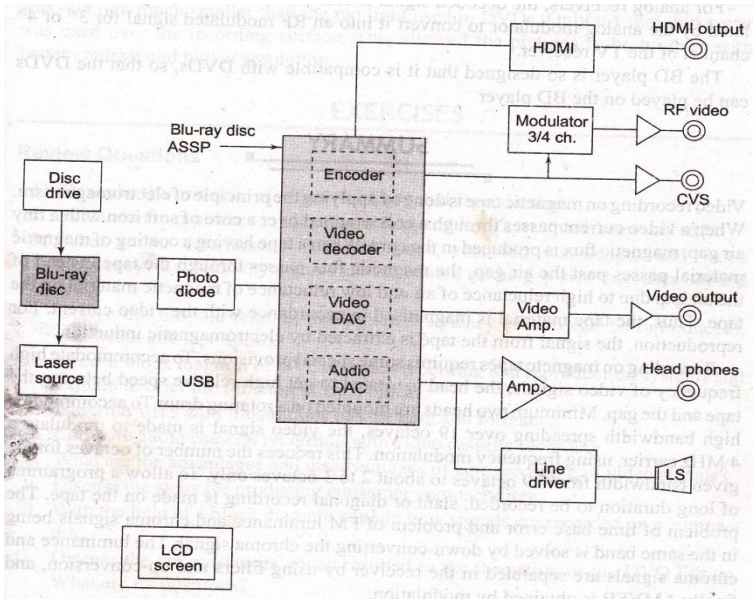
(ii)	**Draw the constructional and block diagram of blue ray disc (BD). Illustrate the function of each block.**	**8M**

Ans:

Construction of Blu-ray disc: **1M**



Block diagram of blu-ray disc player: **4M**

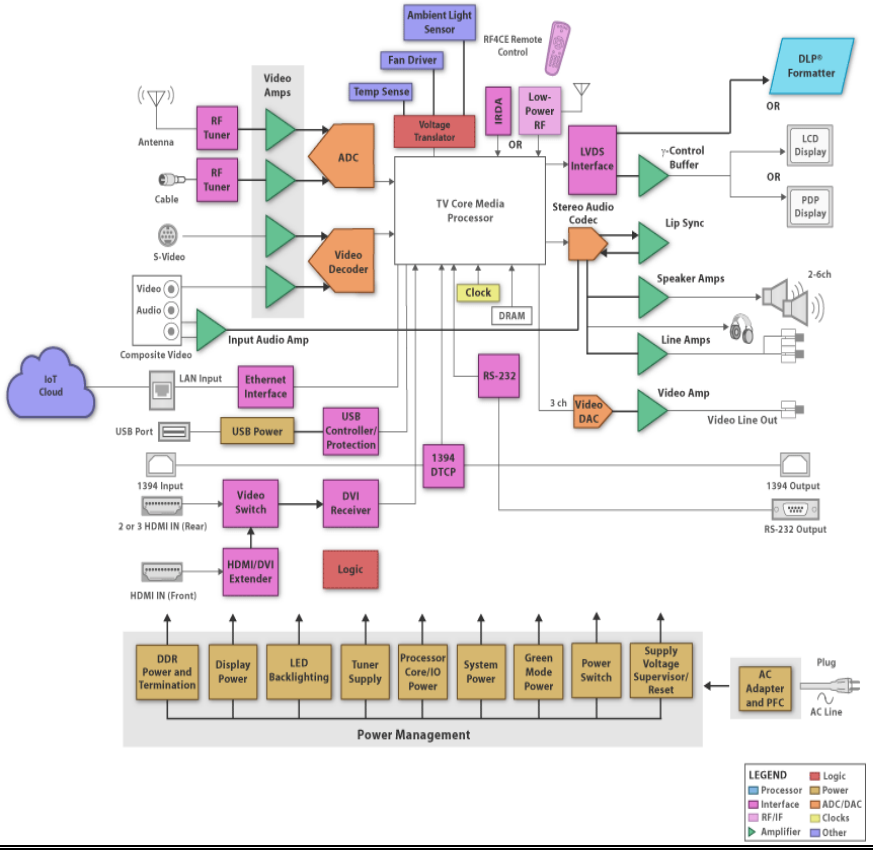


Explanation:

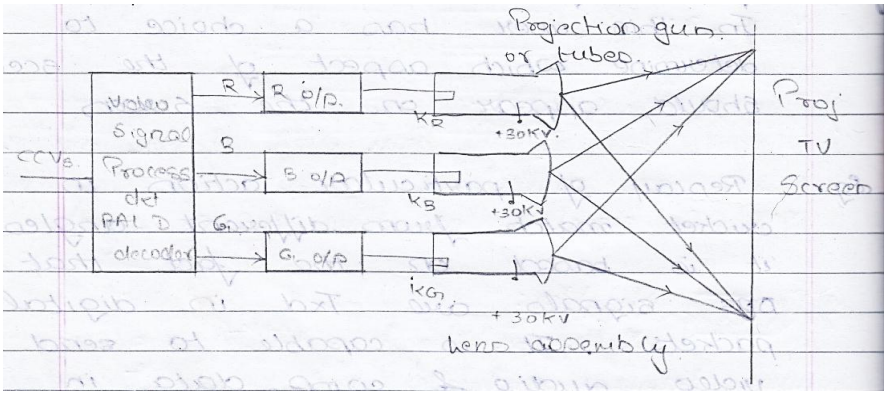
- A source of light (laser) is a light emitting diode (LED) , made of gallium nitride semiconductor, which emits coherent light in blue-violet range at 405nm. This light is incident on the blu-ray disc which is driven by a synchronous motor through a device called disc drive. The disc has billions of pits and lands or flats. Pits do not reflect light, which is reflected by lands only. Thus the outcome of the disc consists of logic 1s and 0s. The digital pulses of light are detected by the photodiode which **3M**

converts optical pulses into pulses of electric current. The pulses can be easily re-conditional to give amplitude of pure logic 1 and logic 0(removing the deformations caused by lenses).

- The electric pulses pass through an application specific standard product (ASSP) processor designed specifically for blu-ray discs. The ASSP is an integrated circuits containing decompress or decoder and digital to analog convertors. For a digital receiver, the decompressed and decoded pulses from ASSP modulate RF carrier using phase shift keying . The modulated signal pertains to the frequency of third and fourth channel of TV receiver.
- The one which is not being used in local broadcast maybe selected. The TV receiver will process the signal to finally give analog output of sound and picture. The outputs from ASSP are also available in the baseband form, using DAC's for activating the monitors of the player.
- For analog receiver, the decoded signal is converted into an analog signal modulated by analog modulator to convert it into an RF modulated signal for 3rd and 4th channel of TV receiver.
- The BD player is so designed that it compatible with DVDs , so that the DVDs can be played on BD player.

(iii)	**Draw the block diagram of HD TV and illustrate how signal processing takes place in HD TV.**	**8M**
Ans:	**<u>Block Diagram:</u>** 	**4M**

		Basic Function : • The picture captured in HDTV camera tube is video processed which after being suitably processed it is in the frame memory (current) and referred to as new frame. A predicted frame is generated by past frames accumulated in the frame memory (previous).A difference frame is obtained by subtracting the predicted frame from the new frame since the predicted frame closely represents the new frame, there is little information left to be transmitted in the difference frame. this is the first step in video compression. • Compression, of the video signal is achieved by using: i)A transform coder ii) Entropy encoding which takes advantage of redundancy in the signal obtained at the output of the transform coder. • The coded signals along with the digital audio & control signals are multiplexed. • To take care of error during transmission the output of the multiplexer is passed through the channel encoder. The final signal which feeds the modulator. • RF signal is demodulated in the demodulator • Channel decoder corrects any errors that occurred during transmission. The De-multiplexer separates out encoded signals, motion vectors, digital audio & control signals • The encoded signals are processed in an inverse manner recovering the decompressed signals. This is the update information. • The update information is added to the predicted frame to reconstruct the new frame. • The new frame signals are fed to the HDTV display after suitably processed in the video processor. Here the high quality images are finally displayed.	**4M**
Q. 3		**Attempt any FOUR:**	**16M**
	(i)	**State any two value added features of** **(a) CC TV** **(b) CA TV**	**4M**
	Ans:	**(a) CCTV:** • Surveillance:- CCTV is effectively used for security in the campus of defence , banks , supermarkets , etc. To keep eye ove intruders , thieves , and mischief mongers. • Education:- Close-Up of demonstration experiments, surgical operations, etc. can be shown on large monitors with audio system to a large number of students . • Medical care:- CCTV cameras fitted at intensive care units enable the doctors to monitor the condition of serious or critically ill patients. • Industry:- Remote inspection of machine • Safety	**(CCTV- any two features 2 M)**

		• Traffic Control **(b) <u>CATV:</u>** • As Television broadcast system • Cable internet modem. • Education • FM Radio broadcasting. • Program on demand broadcasting from cable operator. • Video-Tex • Cable phone • E-business • Local advertising	**(CATV-any two features 2M)**
	(ii)	**Explain the working principle of projection TV to get large screen.**	**4M**
	Ans:	**<u>Diagram:</u>**  **<u>Explanation:</u>** • It consist of three special tubes(R,G and B) with concave lens which are enlarged and projected on a screen lacated 2.5m away. • Video signal process circuit contains PAL-D decoder IC. Its convert input CCVS to R,G,B signal. • R,G,B signal are amplified and applied to cathode of three different projection gues or tubes.	**2M** **2M**
	(iii)	**How is plasma screen colour television different from conventional CRT TV?**	**4M**

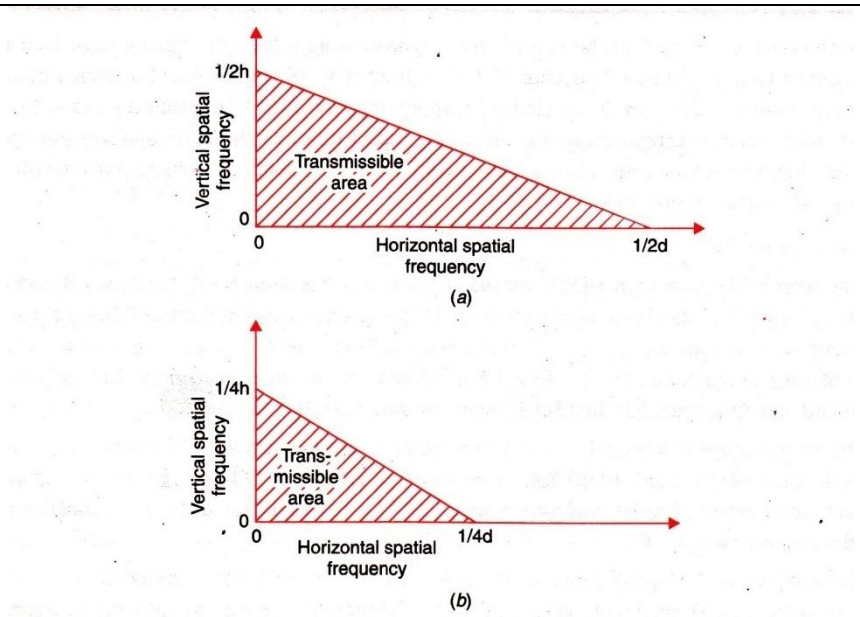
	Ans:		**(Any four point: 1 M each)**

CRT display	Plasma display
1)A CRT has a gun which shoots an electron beam to the screen, which energizes a phosphor.	1)Plasma screens consists of tiny gas cells that illuminate and change color from the application of signal voltages.
2)More power consumption	2)Less power consumption
3)Bulky and heavy	3)Light in weight
4)Moderate picture quality	4)Good picture quality
5)High voltage DC supply is required for operation	5)High voltage DC supply not required for operation

	(iv)	**Compare LED and LCD monitor.** **4M**
	Ans:	**(Any four 1 M for each point)**

LCD	LED
1.Source of light used is the florescent lamps	1.Source of light used is LED
2.Produces high quality image	2.LED‟s give more balance in colour resolution.
3. Florescent lamps are arranged in a grid form.	3. The service of diodes are arranged in several rows
4.use less power	4. Use less power than LCD.
5. They can be made very thin making them less space consuming.	5. They cannot be very thin.

	(v)	**List any four applications of projection TV.**	**4M**
	Ans:	• Conferences • Exhibition • Public meeting • Mini video theatre • Educational institutes	**(any four: 1 M each)**
Q. 4	**A)**	**Attempt any THREE :**	**12M**
	(i)	**Explain muse system in HD TV.**	**4M**
	Ans:	**Diagram:**	**2M**

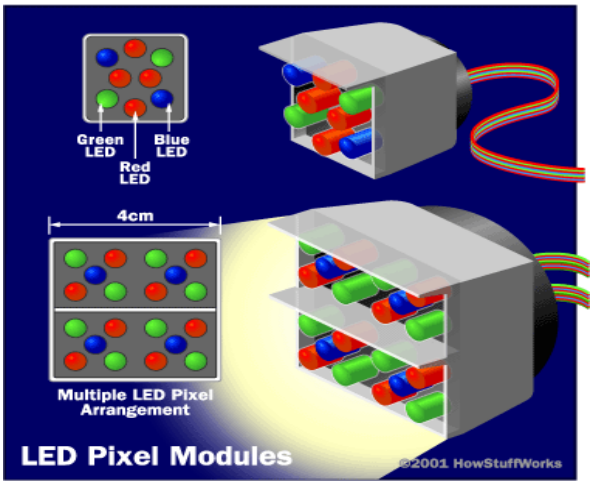


2M

Explanation:

- MUSE stands for Multiple Sub-Nypuist sampling Encoding ans is in HDTV bandwidth compression scheme developed by NHK.
- In Muse the luminance and colour information are sent by time-multiplexed components. The colour information is sent sequentially with a time compression of four.
- The TMC signal is bandwidth reduced by means of a 3-dimensional offset subsampling pattern over a four field sequence. The stationary areas of the picture are reconstructed by temporal interpolation of samples from four field
- For moving picture area the final picture is reconstructed by spatial interpolation using samples from single field. Hence the moving portion of the picture are reproduced with one-quarter the spatial resolution of the stationary areas.

(ii)	**Illustrate the working of LED module in Jumbo TV screen.**	**4M**
Ans:	**Diagram:**	**2M**



Explanation:

In a jumbo TV, red, green and blue LED‟s are used instead of phosphor.

- A “pixel” on a jumbo TV is a small module that can have as few as three or four LED‟s in it (one red, one green and one blue) .in the biggest jumbo TV‟s, each pixel module could have dozens of LED‟s .pixel modules typically range from 4 mm to 4 cm in size.
- To build a jumbo TV, thousands of these LED modules are taken and arranged them in a rectangular grid.

For example, the grid might contain 640 by 480 LED modules, or 307,200 modules. The size of the ultimate screen depends on the size of the LED modules.

LED module size	Screen size(meters)	Screen size(feet)
4 mm	2.56*1.92	8.4*6.3
20 mm	16*12	52.5*39.4
25 mm	25.6*19.2	84*63

2M

(iii) **List equipment used in production studio with their function.** **4M**

Ans: **Listing of different equipment:-** **(Any four: 1 M each)**

- Digitally control Cameras
- Electronic Character generator
- Digital art or Paint box
- Electronic control of studio light
- Digital Audio/Video recorder and editing

Digitally control Cameras:-

Camera control room or the main equipment room is located in the studio complex, generally close to the PCR. Its management is looked after by a TV engineer.

Electronic Character generator:-

It is the use of television graphic tools which includes various titles, photographs, lettering, illustration and diagram.

Digital art or Paint box:-

It combines the flexibility of digital video processing with power of computer memory to enable an artist to develop desired graphic totally electronically.

Electronic control of studio light:-

The light control room is located where the control engineer can observed the light in studio. SCR dimmer offer added flexibility in their ability to be interfaced with computer memory system which stores information about each light dimmer setting.

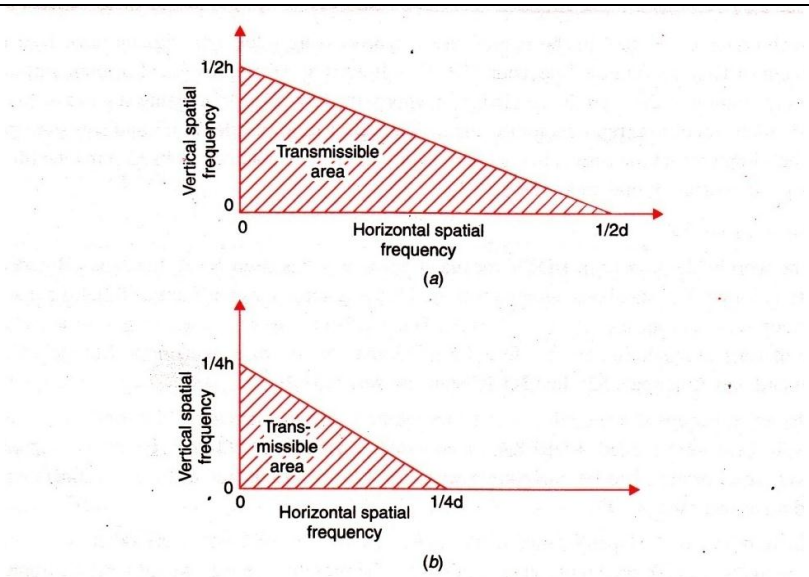
Digital audio/Video recorder and editing:-

In a digital system the original signal produced by microphone/Camera are converted (digitized) into computer like numerical code.

Computer assisted editing system offer video tape editing operation.

(iv) **Describe how bandwidth reduction is achieved in HD TV.** **4M**

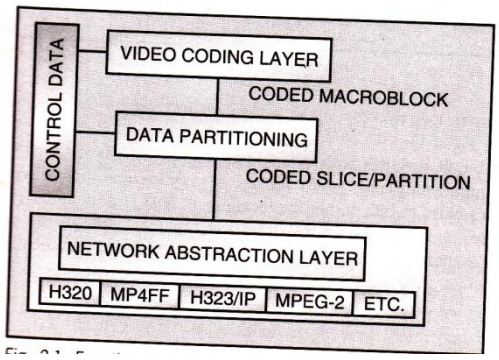
Ans: **Diagram:** **2M**



Bandwidth can be reduced by MUSE(Multiple Sub –Nyquist Sampling Encoding) system **2M**

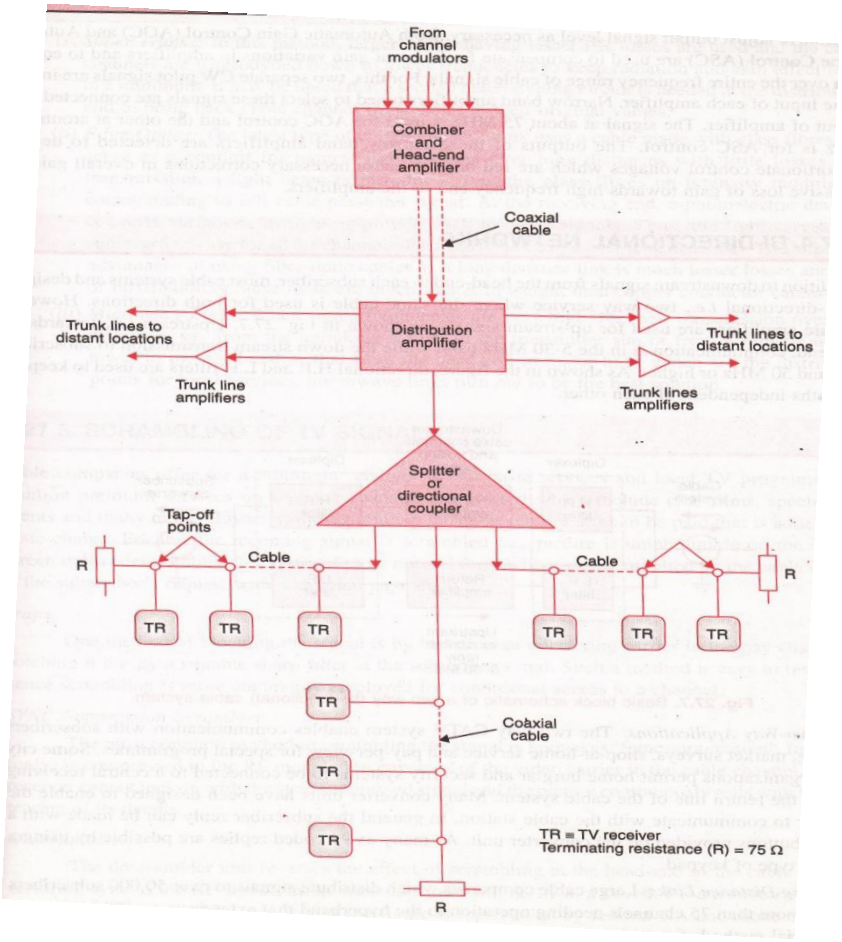
- MUSE stands for Multiple Sub-Nyquist sampling encoding and is an HDTV bandwidth compression scheme developed by NHK.
- It uses the fundamental concepts of performance exchange in the spatio-temporal(transitory transformation) domain along with motion compensation to reduce the transmission bandwidth down to near 10MHz.
- The processed HDTV signal can then be transmitted using a single DBS channel. In MUSE the luminance and colour information are sent by Time-multiplexed components (TMC).

(B)	**Attempt any ONE :**	**6M**
(i)	**Draw the block diagram of MP4 player and illustrate the function each block.**	**6M**
Ans:	**Block diagram:**	**2M**

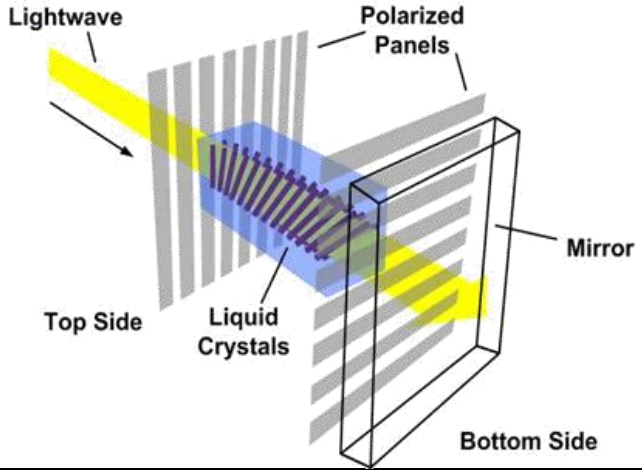


Explanation: **4M**

- Video Coding layer: Its is design to efficiently represent the video content
- Network Abstraction Layer: It formats the VCL representation of the video and provides header information in a manner appropriate for conveyance by a variety of transport layers or storage media

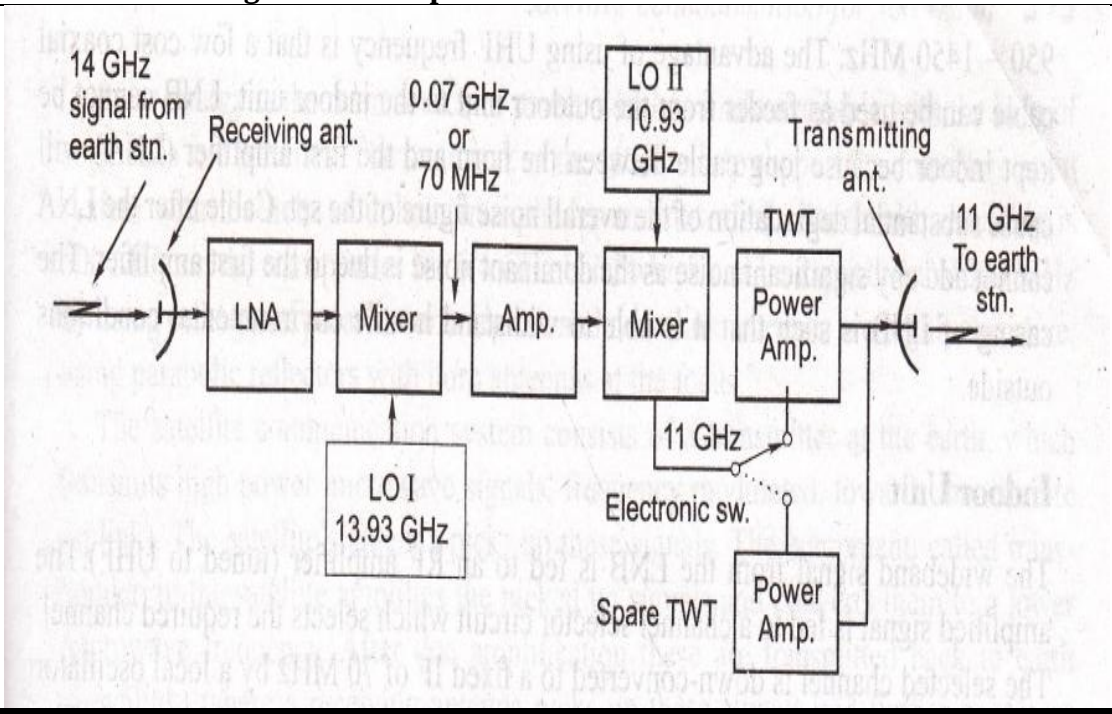
		• For the friendliness of communication channel, a NAL unit specifies both byte stream and packet based formats. • The byte stream format defines the specific pattern of unique start code prefix for use by application that deliver some or all of the NAL unit stream as an ordered stream of bytes or bits within the location of NAL unit boundaries. • The pocker based format defines the data packet that is framed by the system transport protocol, without use of start code prefix for application using RTP/UDP/IP (Internet protocol)	
	(ii)	**Draw the block diagram of plan for CA TV system. How signal processing and distribution takes place?**	**6M**
	Ans:	**Diagram:**  **Explanation:** • The main building or facility is called the headed. • The antennas receive local TV stations and other nearby stations plus the special cable channel signals distributed by satellite. • Parabolic dishes are used to pick up the so-called premium cable channels. A cable TV company uses many TVantennas and receivers to pick up the stations whose programming it will redistribute. These signals are then processed and combined or frequency-multiplexed onto a single cable. • The main output cable is called the trunk cable which is buried and extended to	**3M** **3M**

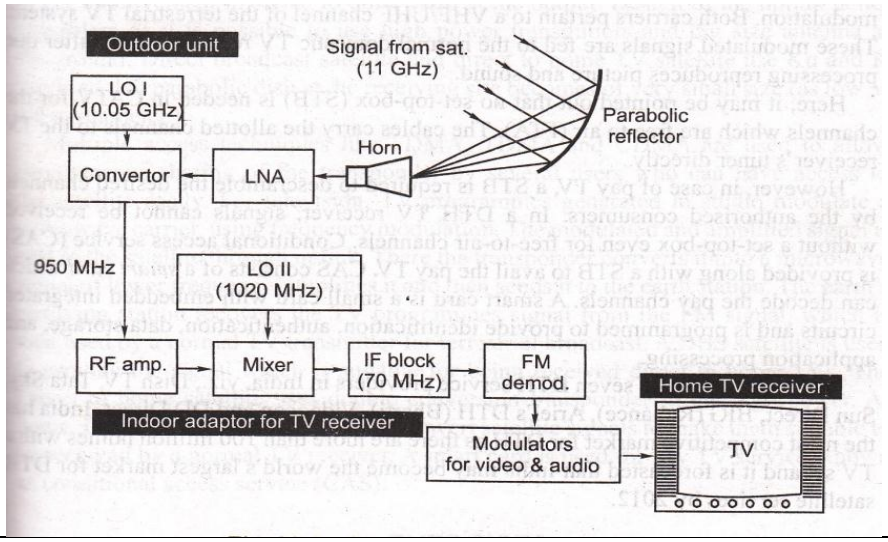
		surrounding areas. • A junction box containing amplifiers takes the signal and redistributes it to smaller cables, called feeders, which go to specific areas and neighborhoods. • From there the signals are again rejuvenated with amplifiers and sent to individual homes by coaxial cables called drops. The overall system is referred to as a hybrid fiber cable (HFC) system. • The coaxial cable (usually) comes into a home and is connected to a cable decoder box, which is essentially a special TV tuner that picks up the cable channels and provides a frequency synthesizer and mixer to select the desired channel. • The mixer output is heterodyned to TV channel 3 or 4 and then fed to the TV set antenna terminals. • The desired signal is frequency-translated by the cable box to channel 3 or 4 that the TV set can receive.	
Q.5		**Attempt any FOUR :**	**16M**
	(i)	**State any four advantages of DVD. How data storing capacity is enhanced?**	**4M**
	Ans:	1.DVD has a huge storage capacity 2. Designed from the outset for video, audio, computer and multimedia, and not just audio ,it is very versatile. 3. All formats use a common file system, and hence there is no problem of compatibility. 4. Overall size is quite small and handy, hence it is portable. 5. Its replication is easy and inexpensive. 6. The strength is same as in a CD, due to the bonding of two substrates. 7. It uses efficient error detection and correcting codes. 8. CDs and VCDs can be played on a DVD player without any difficulty but not vice versa. **How data storing capacity is enhanced?** **1**. The real breakthrough in enhancing the capacity of laser disc came when laser of smaller wavelength was used. In DVDs, red light laser was being used 635 nm. for professional use an 650 nm. For commercial use. This wavelength was lot smaller than the wavelength of 718nm (Infrared light) used in CDs .A smaller wavelength resulted in smaller spot. A sharper beam spot increased in capacity in two ways. i. Adjacent tracks became closer allowing mode tracks per disc .DVD track pitch was reduced to 0.74mm which is less than half of CDs (1.6mm) ii. The pits where data is stored became much smaller than those in a CD. Minimum pit length in DVD is 0.4 mm only which is less than half of 0.834mm in CD. This allowed more pits per track. **2.** Information can be scanned from more than one layer in DVD, simply by changing the focus of the laser beam. Instead of using an opaque reflective layers ,it is possible to translucent layer with an opaque layer behind it .while a single cannot be as dense as the first layer and therefore the capacity of two layers is slightly less than two time 0f single layer by about (10%). The provision of two layers enables the user to use the DVD with higher capacity without removing it from the drive and turning over. **3.** DVD allows double sided discs. Thinner plastic disc was required for the laser beam	**(Advantages: ½M each,)** **2M**

		to focus on the smaller pit depths. This required only 0.6mm thick dick, just half thickness of CD. Such thin discs were rather too thin to with stand handling. Hence two discs were bounded back to back, making the whole discs 1.2mm thick. While bonding was necessary for rigidity, is doubled the storage capacity as two substrates could be used to record the data. (In single sided DVD also, bounding is used for strength, but the data is recorded on one substrate only, the other one remaining black.) **4.** DVD uses more efficient error correction code (ECC). The bits used for error detection consume the space which otherwise could have been used to carry the data. Smaller the number of error detecting and correcting bits, les would be the space require for them and hence more would be the room for real data . **5.** DVD uses the format of MPEG-2 (Moving Picture Experts Group of International Standards Organization) for coding and recording which gives higher quality than MPEG-1 used in CD.	
	(ii)	**Illustrate how a basic LCD can be created. Why application of electric charge across it either blocks of permits passage of light through its layers?**	**4M**
	Ans:	**<u>Creating LCD:</u>** The four factors that enable making of LCD panels 1) Light can be polarized 2) Liquid crystals can transmit and change polarized light 3) The structure of liquid crystals can be changed by electric current. 4) Availability of transparent substances that can be conduct electricity. **Why application of electric charge across it either blocks of permits passage of light through its layers?-** If an electric charge is applied to liquid crystal molecules they untwist. On straightening out they change the angle of light passing through them so that it no longer matches the angle of the top polarized filter. Consequently, no light can pass through that area of the LCD, which makes it darker than the surrounding areas. If the glass panel is divided into a large number of sections insulated from each other, the nature of applied charge applied to them will produce either dark or light areas.  	**2M** **2M**
	(iii)	**Illustrate the different between normal TV and projection TV on the basis of**	**4M**

		(a) aspect ratio, (b) resolution (c) number of lines (d) application.	
	Ans:		**(1M for each)**

Parameter	Normal TV	Projection TV
(a) Aspect ratio	4:3	4:3
(b) Resolution	720 * 576	1920*1080 pixel
(c) Number of lines	625 lines	625 lines
(d) Application.	Used in Home	Used in Seminars,Conferences,Exibitation,Public metting,Mini Video theatre

(iv)	**Describe why (a) CC TV is wired system (b) Audio signal is not transmitted in CC TV.**	**4M**
Ans:	**(a) CCTV is wired system** 1. In CCTV a signal is transmitted without modulation in limited physical area. 2. The monitor which are receiver uses, only requires signal through cable without RF and IF signals. **(b) Audio signal is not transmitted in CCTV** The following are the reasons why in CCTV Audio signal is not transmitted in CCTV. 1. It may increase total cabling and switching 2. We have to use microphones and audio processing units. Therefore system cost and complexity will increase 3. The system may require large power source 4. Audio transmission system may interfere with video transmission 5. Provision to record audio signal will be required	**2M** **(Any Four points 2M)**
(v)	**Draw the block diagram of transponder for DTH.**	**4M**
Ans:		
Q.6	**Attempt any FOUR :**	**16M**

	(i)	**What are commonly used file formats? Explain any one in brief.**	**4M**
	Ans:	**TIFF:** A TIFF file, or TIF file, stands for tagged Image File Format. TIF files are a common file format for images, especially those used on graphic design. The file extension for a TIFF file is either .tiff or .tiff. **BMP:** The BMP file format, also known as bitmap image file or independent bitmap(DIB) file format or simply a bitmap, is a raster graphics image file format used to store bitmap digital images, independently of the device(such as a graphic adapter), especially on Microsoft Windows and OS/2 operating systems. **GIF:** GIF files are a format commonly used for graphics presented on websites. GIFs can contain a maximum of 256 colors, and are therefore best images that contain simple shapes, a limited color palette, text and other elements as opposed to photos.GIF stands for Graphic Interchange Format. **PNG:** The PNG (Portable Network Graphics) file format was created as the free, open-source successor to GIF. The PNG file format supports 8bit palette images (with **optional** transparency for all palette colors) and 24 bit true color (16 million colors) or 48 bit true color with and without alpha channel-while GIF supports only 256 colors and a single transparent color. **JPEG/JFIF:** JPEG (Joint photographic Experts Group) is a lossy compression method; JPEG/JFIF filename extension is JPG or JPEG. Nearly every digital camera can save images in the JPEG/JFIF format, which supports 8-bit gray scale images and 24 –bit color images (8 bits each for red, green, and blue).	**(Commonly used file formats for video signals are as follows:- (any four) 1 M each**
	(ii)	**Draw the block diagram of DTH receiver. State the function of front end unit.**	**4M**
	Ans:	**Diagram:**  	**2M**

Explanation:-

It consists of following stages:

(1) Dish antenna and LNB (Low Noise Band Converter) section:-

The feed horn collects microwave signals reflected from the antenna surface and ignores noise and other signals coming from off-axis directions.

Then LNB amplifies the signal received through feed horn and converts its frequency from 11 GHz to 950 MHZ and still smaller for K and Kz bands. Thus it down converts frequency. It also converts microwave signals into electrical signals.

The output of the converter consists of a signal of UHF frequency. The miceowave oscillator has a bandwidth of 500 MHZ and so the actuak signal varies from 950-1450 MHZ.

2M

(iii) Compare tracking servo system with carriage servo system. **4M**

Ans: **(Two Point (2M for each)**

Tracking servo system	**Carriage servo system.**
1) Its works if tracking error is small (around 2mm).	1)Its works if tracking error is more than 2 mm.
2) Its moves objective lens in a small amount to correct the tracking error.	2) Its moves optical pick-up assembly to correct the tracking error.

(iv) Classify CRT monitors and state three specifications of monitor. **4M**

Ans: **(Classification: 1M, Specifications- any three: 3M)**

Classification OF CRT monitor:

1) B/W CRT monitor
2) Colour CRT monitor
   a) Flat screen CRT monitor
   b) Curve screen CRT monitor

Specification:

1.Dot Pitch

Its denotes the quality of a given CRT monitor and controlled by the design of the shadow mask or aperture grille inside the CRT.

2. Aspect Ratio

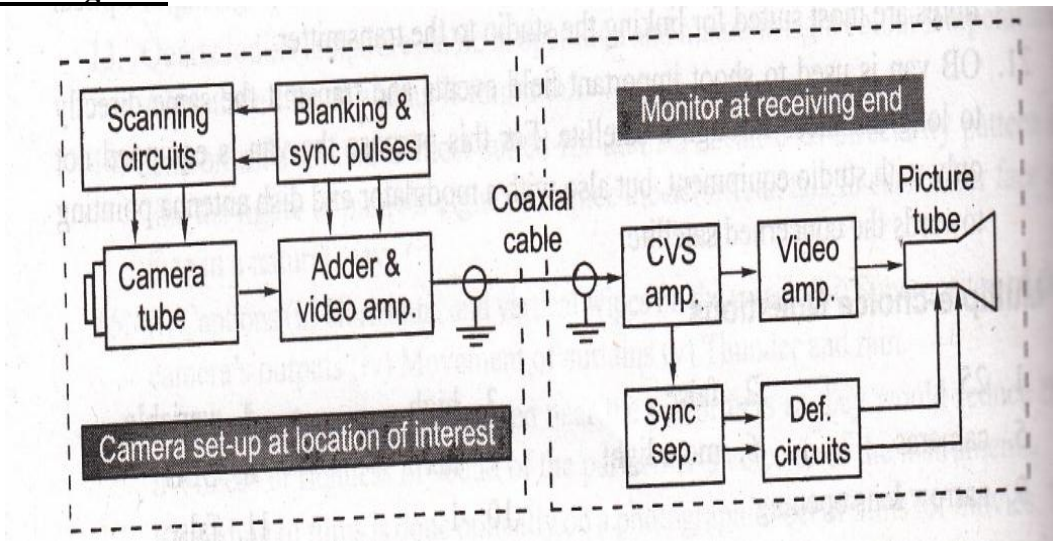
Aspect Ratio is related to the ratio of the image in terms of its size in correlation to the height vs the width. The aspect ratio can be determined by considering the ratio between horizontal and vertical pixels. Common aspect ratios are 4:3 and 16:9 which are both used for TV Broadcasting.

3. Resolution

It is the number of distinct pixels in each dimension that can be displayed. All LCD‟s have a certain number of pixels making up their liquid crystal matrix, and so each LCD has a “native resolution” which matches this number.

4. Video bandwidth

It’s the height input frequency that monitor can handle and helps in determining resolution capability of monitor.

	(v)	**Illustrate the role of computer system and power control system in plasma TV.**	**4M**
	Ans:	Role of computer system and power control system in plasma TV: Plasma panels use pulse-width modulation (PWM) to control brightness. A computerize power control system is used in Plasma TV which varies the width of current pulses flowing through the different cells thousands of times per second. The control system can increase or decrease the intensity of each sub pixel colour to create billions of different combinations of red, green and blue. In this way, the control system can produce most of the visible colours. Plasma displays use the same phosphors as CRTs, which accounts for the extremely accurate colour reproduction when viewing television.	**[Computer system is used for senceing the intensity - 2M, Power control system is used to control the variations of basic RGB colours- 2M]**
	(vi)	**Draw and explain block diagram of CC TV.**	**4M**
	Ans:	**Block diagram:**  **Explanation:** **Working :-** CCTV is a system in which video signal obtained by one or more camera tubes is sent to one or more monitors through coaxial cables. **Camera Tube:** It is the eye of CCTV system and can be placed at any strategic location to see the scene and convert it into a video signal. It is equipped with scanning circuit which produces deflection current for horizontal and vertical deflection. These currents are duly synchronized by blanking and sync pulse generators. The camera tube is visually of vidicon type. **Video Amplifier at the Transmitting End:** This amplifies video output of the camera tube. Banking and sync pulses are added to the signal, resulting in a composite video signal. As high frequency component of the video	**2M**

		signal are attenuated more in the coaxial cable than low frequency components, there is pre-emphasis of high frequency signals. This takes care of uneven attenuation in the cable. The camera tube along with the amplifiers is put in a weather proof case. **Coaxial Cable:** It carries the video signal to the monitoring room. The characteristic impedance of the cable is 75Ω. **Video Amplifier at the Receiving End:** Due to the attenuation in the coaxial cable, the signal level drops below the level required by the monitor. An amplifier is therefore used. The input impedance of the amplifier matches with the impedance of the cable. In case of several monitor, a distribution amplifier is used which feeds signal to individual monitor through matching pads. A monitor is a TV receiver without RF, IF and detector stages. Each monitor contains video amplifiers detection stages and a picture tube. The scene at which the camera tube was focused is display on the screen of the monitor. A signal monitor for several camera tubes can be used by employing a switching arrangement to switch the video signal from various cameras in an automatic sequence or manually as per need.	