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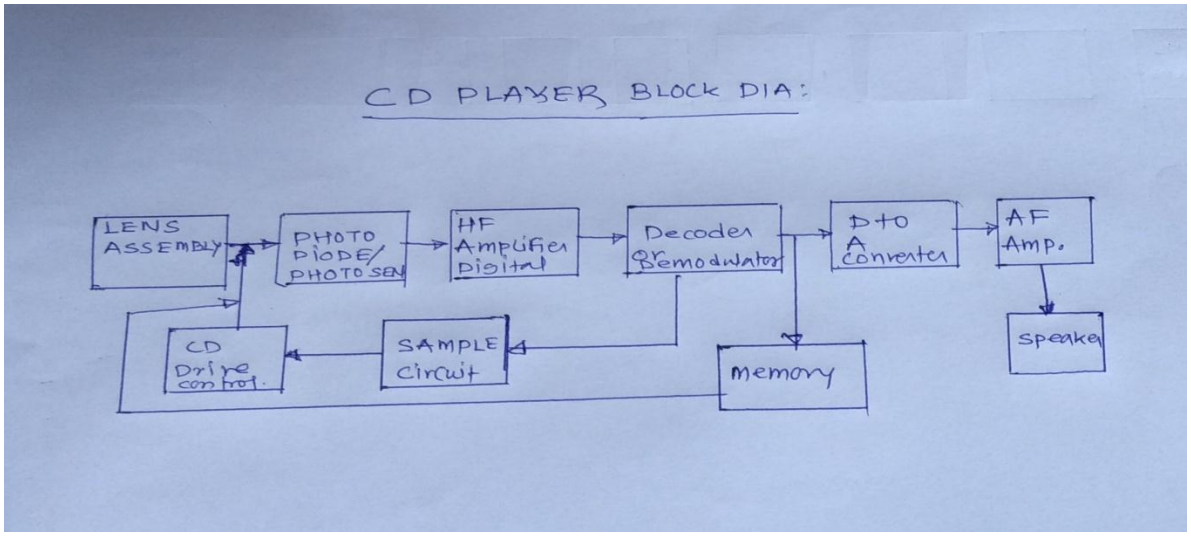
MODEL ANSWER

SUMMER– 19 EXAMINATION

Subject Title: Consumer Electronics Subject Code:22425

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 judgment 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		**Attempt any FIVE:**	10M
	a)	**Draw block diagram of CD player.**	2M
	Ans:	**Diagram: (for any other relevant diagram mark should given)**  **OR**	2M

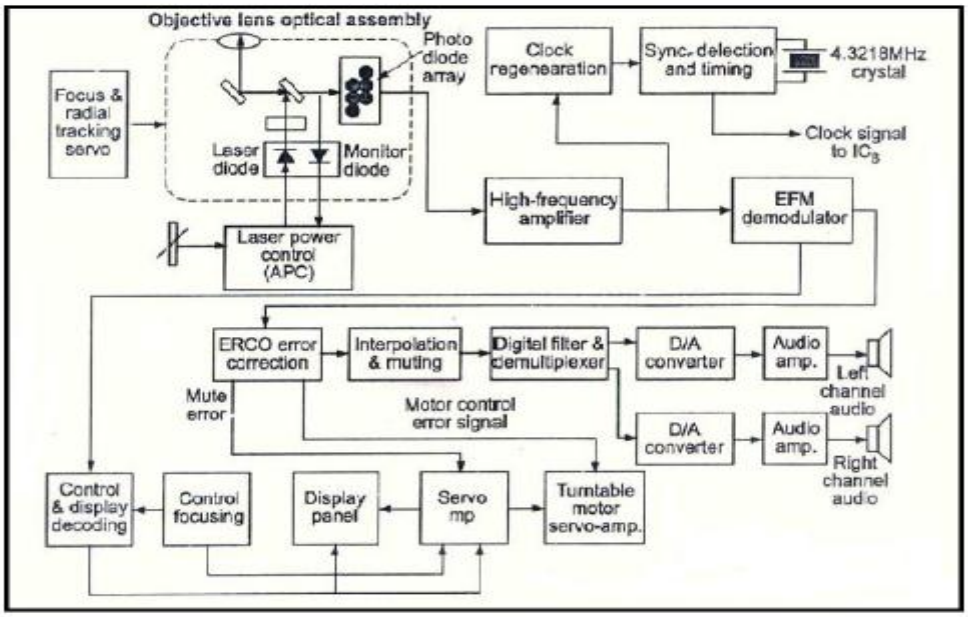


Figure: Block diagram of CD player

b) **List the different components used in CD player.** **2M**

Ans:

- **CD mechanism**
- **CD pick up assembly**
- **Gear system**
- **Motors**
- **CD lens**
- **Display panel**
- **Front panel**
- **Servo systems.**

½ marks for each

c) **Compare woofer & midrange speaker(any two points).** **2M**

Ans: **1M Each point**

Sr. No	PARAMETER	WOOFER	MID-RANGE (SQUAWKER)
1.	**Definition**	A woofer is a technical term for loudspeaker driver designed to produce low frequency sounds	A mid-range speaker is a loudspeaker driver that reproduces sound in the frequency range from 250 to 2000Hz

2.	**Range of Frequency**	16Hz to 500Hz (This range can vary as per manufacture can be upto 800Hz)	500Hz to 5KHz (This range can vary as per manufacture can be upto 1500Hz)	
3.	**Size & Physical Structure**	Size is largest	They are of medium size, kept in between tweeter & woofer.	
4.	**Weight**	Heavier than tweeter & Squeaker	Heavy than tweeter & light in weight than woofer	

d) **Describe the function of MUSE system for HDTV.** **2M**

Ans:

- Bandwidth can be reduced by MUSE (Multiple Sub –Nyquist Sampling Encoding) system
- MUSE stands for Multiple Sub-Nyquist sampling encoding and is an HDTV bandwidth compression schemedeveloped 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 bandwidthdown to near 10MHz.
- The processed HDTV signal can then be transmitted using a single DBS channel. In MUSE the luminance andcolour information are sent by Time-multiplexed components (TMC).
- In Muse the luminance and colour information are sent by time-multiplexedcomponents. The colour information is sent sequentially with a time compression offour.

OR

- MUSE stand for **MU**ltiple **S**ub-Nyquist **S**ampling **E**ncoding and NHK (Nippo Hoso Kyokol) is Japanese company develop encoding system for HDTV.
- In this system the luminance and colour information are sent by Time Multiplxed component
- Colour information is sent sequentially with time compression of four. So bandwidth is reduced.
- Muse system has 1125 interlaced scanning line.
- It has 60 Hz frequency with 5/3 aspect ratio.
- The pre compression for Y signal is 20 MHz and chrominance signal is 7Mhz.
- MUSE digital Audio system is called DANCE (Digital Audio Near-Instantaneous Compression and expansion).

1M for each function

e) State any four electrical specifications of microwave oven. — **2M**

Ans: — **½ marks each**

- Supply voltage: 220 volts,50 Hz. Single phase A.C.
- Power consumption: 1300 W approx.(power consumption vary as manufacturer from500W to 1500W)
- Microwave power: 700 w-850 W
- Microwave frequency: 2450 Mhz (1000Mhz to 3000Mhz)
- Timer: 60 min. – 90 min(timer can also varied)
- Control: Soft/one touch control

f) Differentiate between mono and stereo amplifier w.r.t. (i)no. of amplifier (ii)applications. — **2M**

Ans: — **1 marks each**

Parameter	Mono amplifier	Sterio amplifier
Number of amplifier	Single amplifier	Two amplifier
Applications	Used in public address system	Used in Hi-Fi amplifier system

g) Explain the function of exposer in photocopier machine. — **2M**

Ans: — **1M each**

- A bright lamp illuminates the original document, and the whitws areas of the original document reflect the light onto the surface of the photoconductive drum.
- The areas of the drum that are exposed to light become conductive and therefore discharge to the ground.
- The areas of the drum not exposed to light remains negatively charged.

Q 2 Attempt any THREE : — **12M**

a) Describe the operating principle of condenser type microphone with neat diagram. — **4M**

Ans: — **2M**

Principle:

- When sound pressure moves the diapharam in, the capacitance increases, and when it moves out, the capacitance decreases.
- The change in capacitance results in change in out put voltage of microphone.

Equation 1 shows that if C increases, V will decrease and if C decrease, V will increase

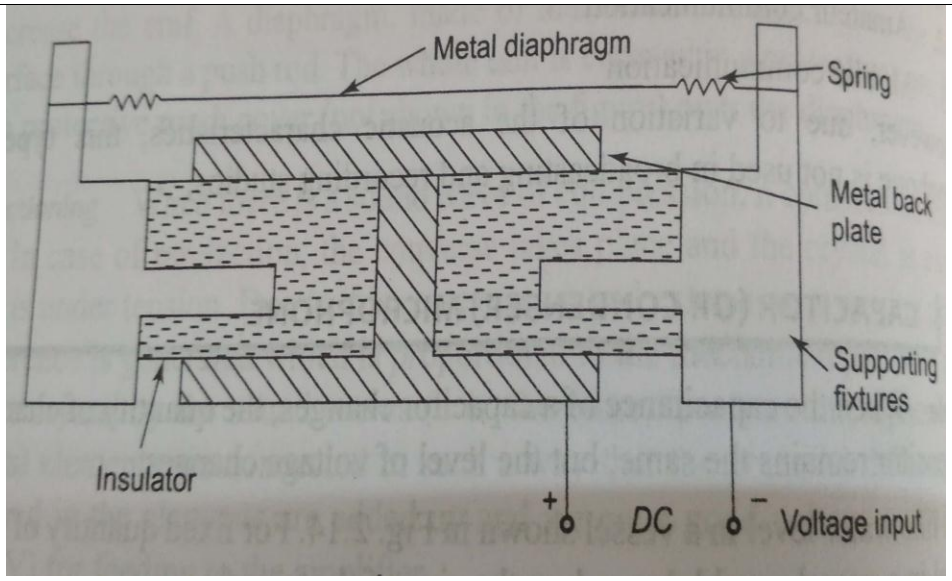
V=Q/C ----------(1)

Where V=Voltage across the capacitor in volts.

Q= charge in coulombs

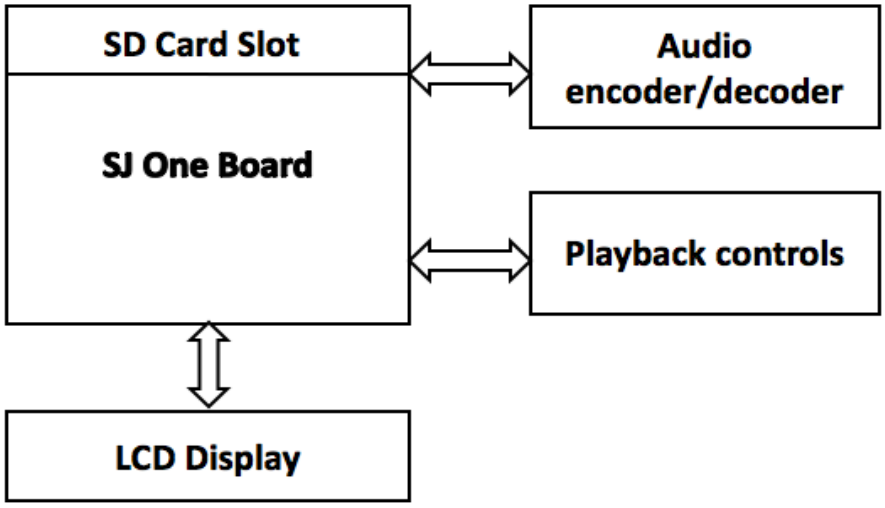
C= capacitance in farad

Diagram: — **2M**

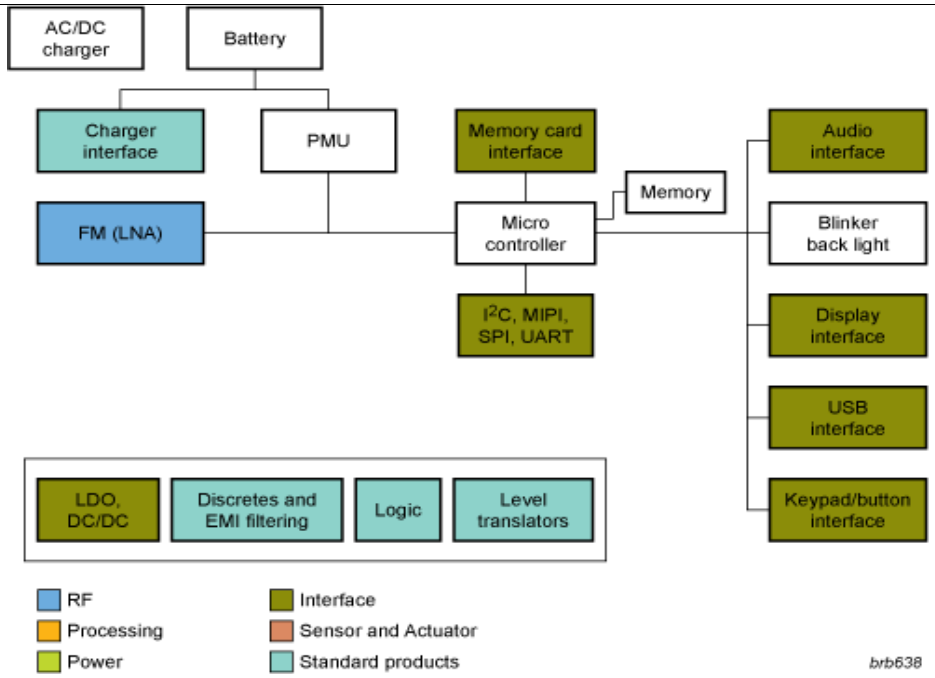


b)	**Draw and explain the working of MP3 player.**	**4M**
Ans:	**Block diagram: (Consider any other relevant diagram)**	**2M**

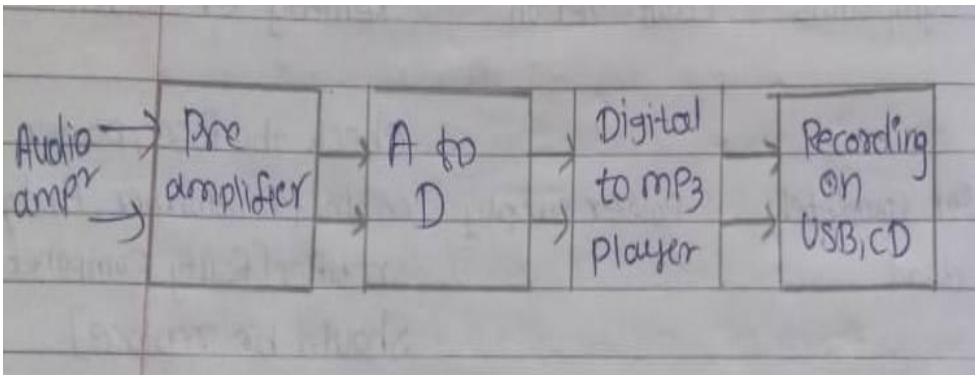
MP3 Player Block Diagram



OR



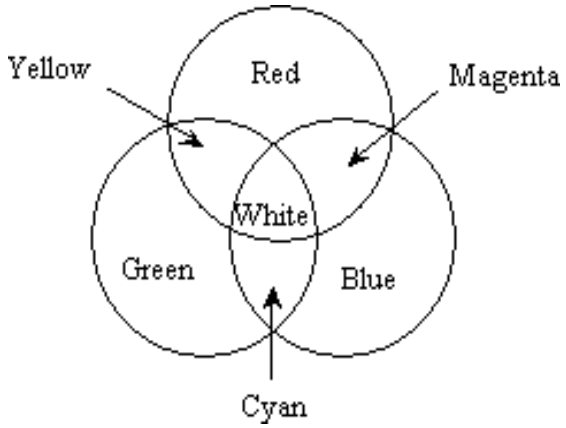
OR



2M

Explanation:

1) **Audio:**
   Our digital audio amplifier family is built to simplify audio architecture by lowering the system cost and enabling easy interfacing. Using a digital interface eliminates the need for a D/A converter in the host processor, and the PDM or I2S format guarantees an ultra small IC footprint.
2) **Charger interface:**
   Whether your device is charged via the USB port or a separate charger, it is exposed to incorrect polarity or abnormally high voltages. Any of these two occurrences poses a threat to the charger circuit and the PMU of the mobile device. In addition, the USB/charger port can be subject to ESD strikes and other transient discharges.

	3) Memory Card Interface: According the IEC61000-4-2 standard, SD host interfaces require additional high-level ESD protection, in addition to the integrated ESD protection which is typically very weak. Other strict EMI regulations and system requirements, as specified in GSM mobile phones, strongly request filters that reduce the radiated/conducted EMI. However, they must still comply with the electrical requirements of the interface specification.	
c)	**State Grassman's law.Draw the sketch of additive mixing.**	**4M**
Ans:	**Grassman's Law:** • The eye is not able to distinguish each of the colours that mix to form a new colour but instead perceives only the resultant colour. • The brightness impression created by the the combined light source is numerically equal to the sum of the brightness of the three promaries that constitute the single light. The property of the eye of producing a response which depends on the algebric sum of the red, green and blue inputs **Additive mixing:**  Red: 30%, Green: 59%, Blue: 11% , White 100%, Yellow(R+G)=89%, Cyan(G+B)=70%, Magenta(R+B)=41%	**2M** **2M**
d)	**State working principle and explain working of LCD TV with appropriate diagram.**	**4M**
Ans:		

2M

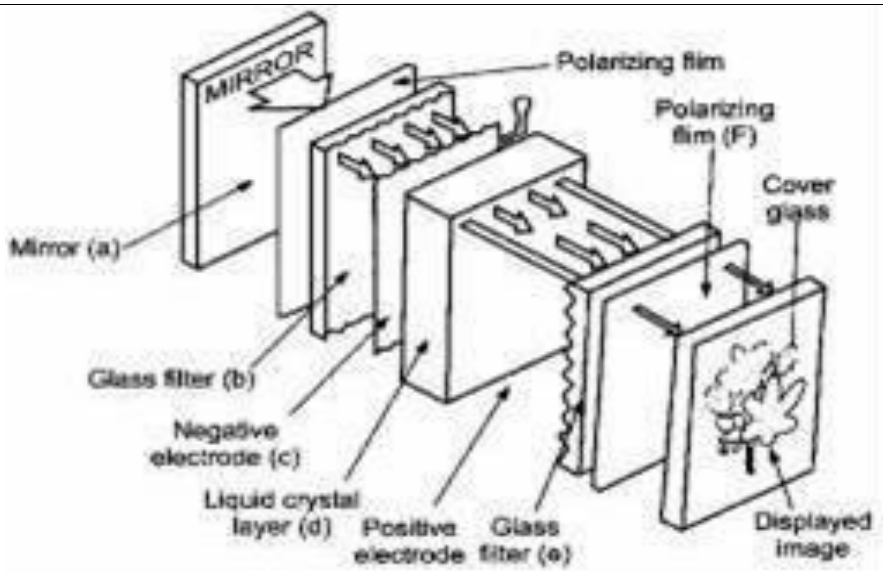
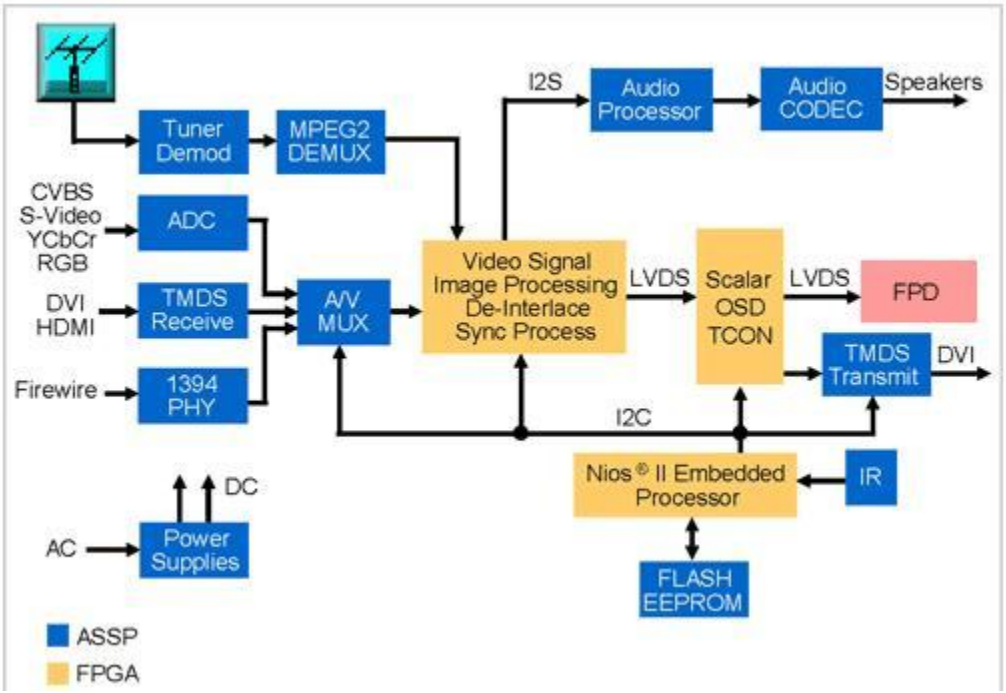
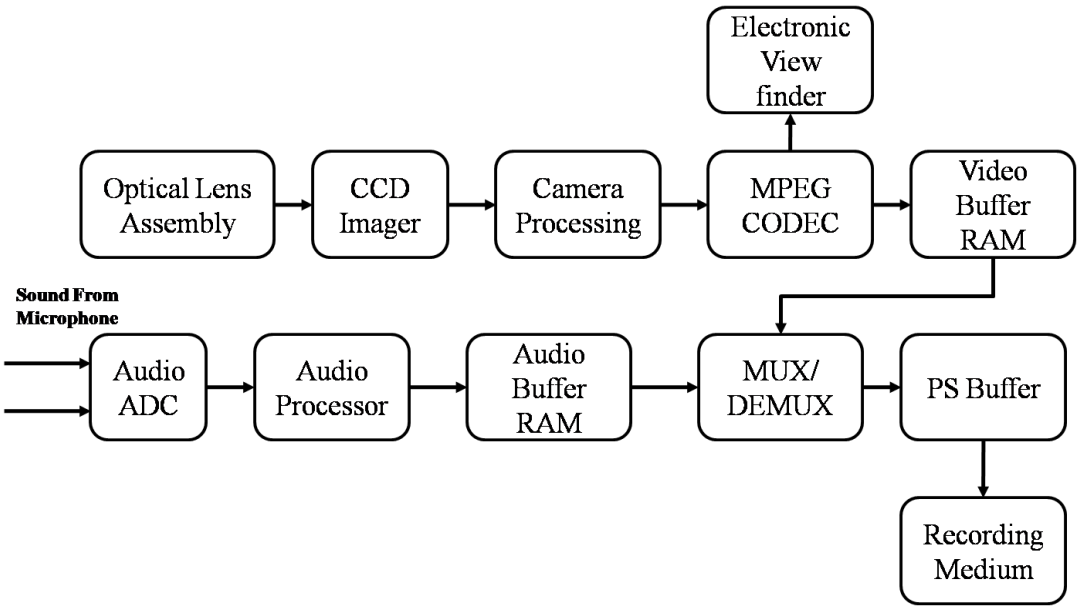


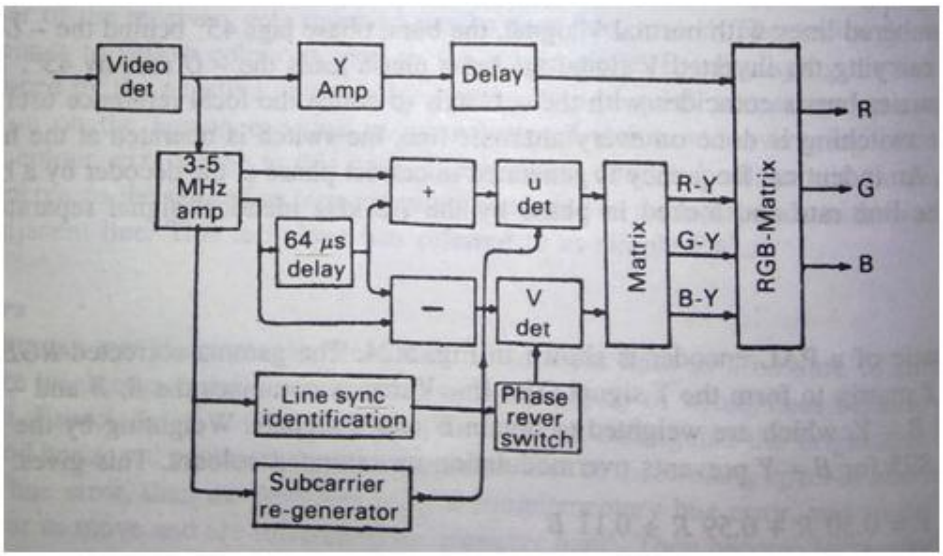
Diagram: (Consider any other relvent diagram)

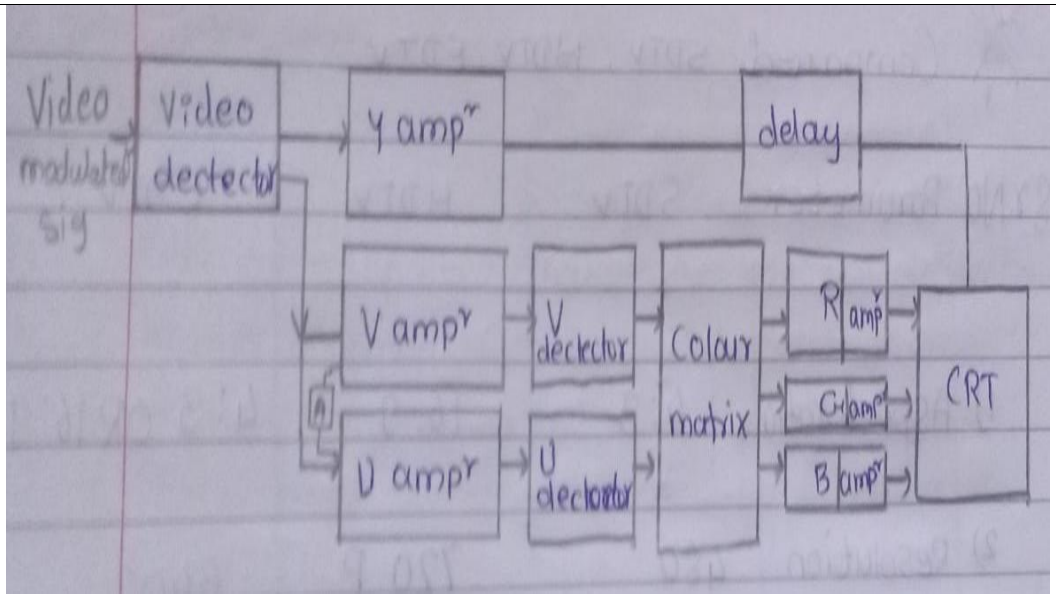


2M

- LCD TV uses the LCD Display technology to produceimages.
- LCD is a form of visual display technology that functions by sandwiching a layer of liquid crystals between two transparent electrodes or conductive surfaces.
- Liquid Crystals are specialized molecules that flow like liquidsbut polarize light like solid, crystallinestructures.
- LCD technology works by selective passage of light,

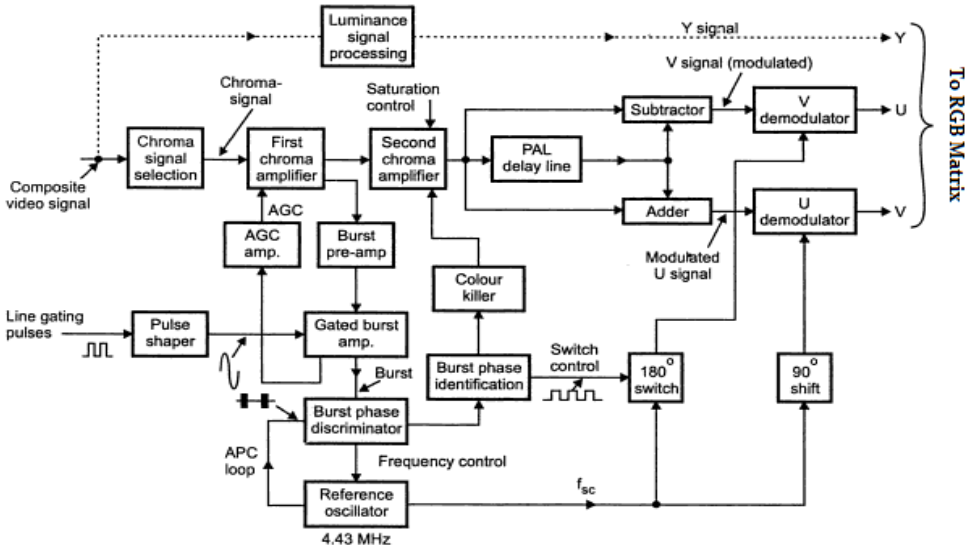
		whichpasses through millions of individual LCDstructures. • These shutters are arranged in grids and constitute coloured filters, allowing only the RGB portion of the light to pass through white lightare typically provided by a series of CCFLs (Cold Cathode Fluorescent Lamps), which are rear of thescreen. Every single sub – pixel is formed by a shutter filter combination, andthese sub – pixels blend together to form wholepicture.	
Q.3		**Attempt any three:**	**12 M**
	a)	**Explain working of Digital camcoder.**	**4M**
	Ans:	 **Fig: Block diagram of Camcorder** **Explanation:** • Figure shows the functional block diagram of a digital camcorder system. Light from the optical lens assembly projects an image onto the *charged coupled device* (*CCD*) imager. The CCD is a photosensitive array which is charged by the light falling on it. • The charge is then converted into a continuous analogue voltage when the CCD charged elements are scanned line by line. • After the scan is completed, the CCD elements are reset to start the exposure process for the next video frame. Embedded within the CCD is an analogue-to-digital converter to produce a digital output for further processing by the camera processing block ready for data compression by the MPEG codec. • The camera processing chip carries out such functions as '*steady shot*', zoom and focus motor control and digital picture effects. The MPEG-coded data are fed into a video buffer. • Digitised Y/C data are also fed into the *electronic viewfinder* (*EVF*) for monitoring by the user. Stereo sound from audio microphones are A/D converted and the PCM audio data placed into an audio buffer.	**2M** **2M**

	• The MUX/DEMUX receives the compressed video and PCM audio streams from the corresponding buffers, packetises and multiplexes them into a standard MPEG-2 program stream (PS) to be stored in a PS buffer. • Data in the PS buffer are then used to write on the recording medium which could be a DVD disc, an HDD or a magnetic tape. • In the playback mode, the process is reversed and this is the reason for using an MPEG codec chip instead of just a coder and MUX/DEMUX instead of just a MUX. In the playback mode, data from the recording medium are demultiplexed and decompressed and fed into the EVF for display.	
b)	**State four Electrical specifications with values for washing machine.**	**4M**
Ans:	**(Note: any other relevant specifications can be considered)** **1.** Type: Top loading / Front loading type **2.** Capacity range: 6kg to 15kg **3.** Motor Used: Induction motor **4.** Input voltage: 100V- 240V **5.** Power: in 1200W / Output power 100–400W{can go upto 1000W) **6.** Efficiency: Max efficiency 31% **7.** Wattage: 2.100-2.400 W **8.** Current: 13A **9.** Frequency: 50hz	**1M Each (Any 4)**
c)	**Draw the block diagram of PAL-D decoder and write function of each block.**	**4M**
Ans:	**Diagram:** **(NOTE: any other relevent diagram can be consider like croma amplifier with u v amplifier and with RGB amplifier included then mark will be given)**  **OR**	**2M**



- In the block diagram there are 64us delay line, a switch operated by colour burst signal, add and subtract network and RGB matrix
- Separate U and V obtained then mixed with Y signal through delay line
- Matrix output will separated R, G, and B depend on voltage level content in video signal which will further connected to RGB amplifier.
- Weighted factor U=B-Y and V=R-Y
- Switch will reverse subcarrier signal with phaseY signal has Bandwidth of 5Mhz

OR



Block diagram of PAL-D decoder

Explanation: **2M**

Chroma signal selection:

Its function is to select Chroma and colour burst signal from the incoming CCVS signal. It essentially consist of band pass circuit whose center frequency is chosen to be equal to that of Chroma sub-carrier itself i.e.4.43MHz.

1st Chroma amplifier:

The Chroma and burst signals are amplified by first Chroma amplifier which is controlled by DC voltage developed by the Automatic Chroma Control (ACC) amplifier.

2nd Chroma amplifier:

The second Chroma amplifier incorporates colour saturation control circuit. The output of colour killer also feeds into it.

PAL delay line (separation of U and V colourphasors):

This network separated U and V signals with are then fed to respective demodulator.

Gated burst amplifier:

The gated burst amplifier separates the burst pulses and amplifies them a level suitable to operate the burst phase discriminator.

Automatic Chroma Control (ACC):

The magnitude of the voltage so fed back is proportional to the magnitude of the burst and therefore to the amplitude of Chroma signal itself. This voltage is used to control the first stage of Chroma amplifier in such way to ensure constant Chroma signal amplitude.

Burst phase discriminator:

It is sensitive to burst pulses and is designed to detect any differences which might exist between the phase of burst pulse and that of the reference oscillator. It produces at its output a dc voltage whose magnitude and polarity are proportional to the magnitude and direction of the detected phase difference.

Burst phase identifier:

This circuit is able to identify the phase relationship of the colour burst.

180º switch:

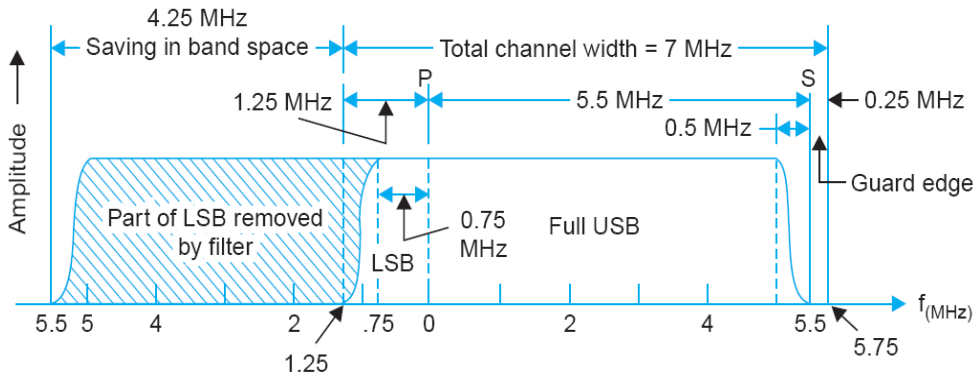
This switch is used to periodically invert the waveform fed to the v-signal demodulator.

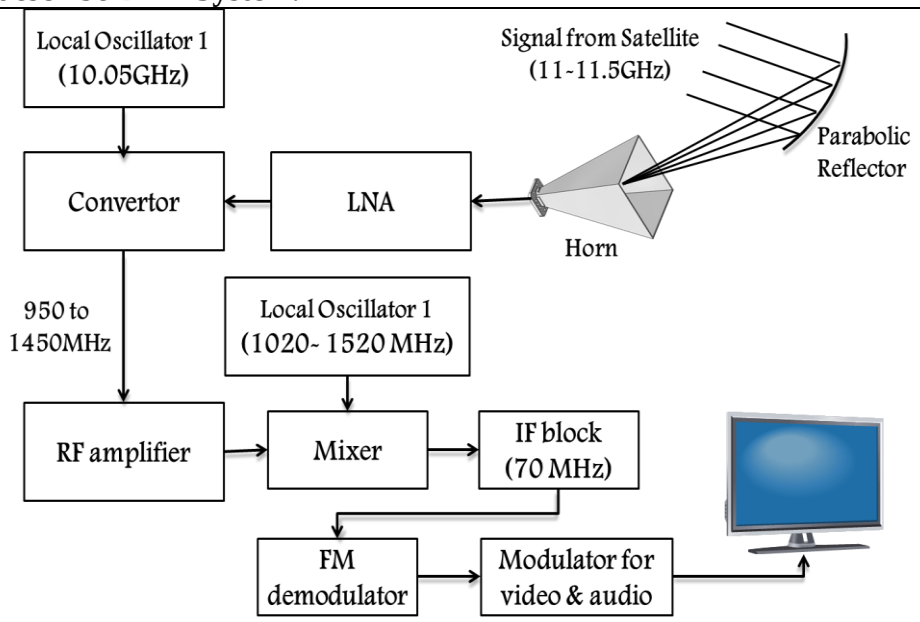
Colour killer control:

This is just a half wave rectifier which produces a steady dc potential from the succession of burst pulses. During black and white transmission the dc potential is absent and hence biases the 2nd Chroma amplifier to cut off state.

d)	**State any four CCIR-B standard for colour signal transmission and four CCIRB standards for reception in TV.**		**4M**
Ans:			**2M colour signal transmission AND 2M CCIRB standards for reception**
	Reception		
	Camera output	R, G, and B video signals	
	Luminance signals	Y=0.30R+0.59G +0.11B	
	Colour difference signals chosen for transmission	(B-Y) and(R-Y)	
	Type of colour signal modulation	Suppressed carrier amplitude modulation Of two subcarriers in quadrature having same numerical value.	
	Colour difference signals	U=0.493(B-Y) V=0.877(R-Y)	
	Composite colour signal	Y+U sin ωm t+-Vcosωmt	
	Amplitude of modulated Chroma signal	u2+v2	
	Colour subcarrier frequency	4.433185 MHz	
	Duration of burst	10+1	
	Chroma encoding	Phase and amplitude modulation	
	Bandwidth for colour signals (u and v)	Fsc-1.3 MHz to fsc+0.6 MHz	
	Transmission		
	No. of lines per picture (frame)	625	
	Field frequency (Fields/second)	50	
	Interlace ratio, i.e., No. of fields/picture	2/1	
	Picture (frame) frequency, i.e., Pictures/second	25	
	Line frequency and tolerance in	15625 ± 0.1%	

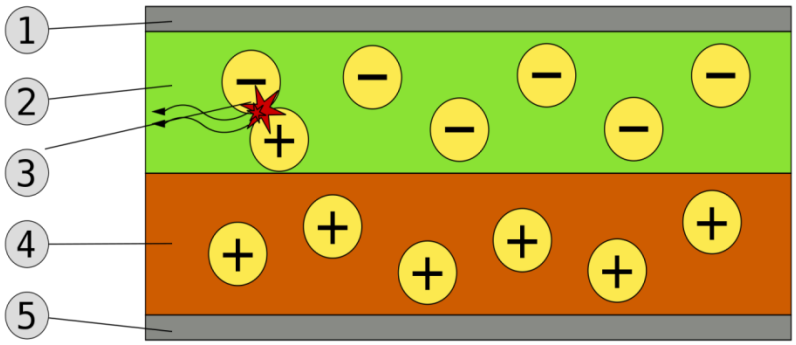
		lines/second,(when operated non-synchronously)		
		Aspect Ratio (width/height)	4/3	
		Scanning sequence	(i) Line: Left to right (ii) Field: Top to bottom	
		System capable of operating independently of power supply frequency	YES	
		Approximate gamma of picture signal	0.5	
		Nominal video bandwidth, i.e., highest video modulating frequency (MHz)	5	
		Nominal Radio frequency bandwidth, i.e., channel bandwidth (MHz)	7	
		Sound carrier relative to vision carrier (MHz)	+5.5	
		Sound carrier relative to nearest edge of channel (MHz)	– 0.25	
		Nearest edge of channel relative to picture carrier (MHz)	–1.25	
		Fully radiated sideband	Upper	
		Nominal width of main sideband (upper) (MHz)	5	
		Width of end-slope of full (Main) sideband (MHz)	0.5	
		Nominal width of vestigial sideband	0.75 MHz	
		Vestigial (attenuated) sideband	Lower	
		Peak white level as a percentage of peak carrier	10 to 12.5	
		Type of sound modulation	FM, ± 50 KHz	
		Pre-emphasis	50 μs	
		Resolution	400 max	
Q.4		**Attempt any THREE :**		**12M**

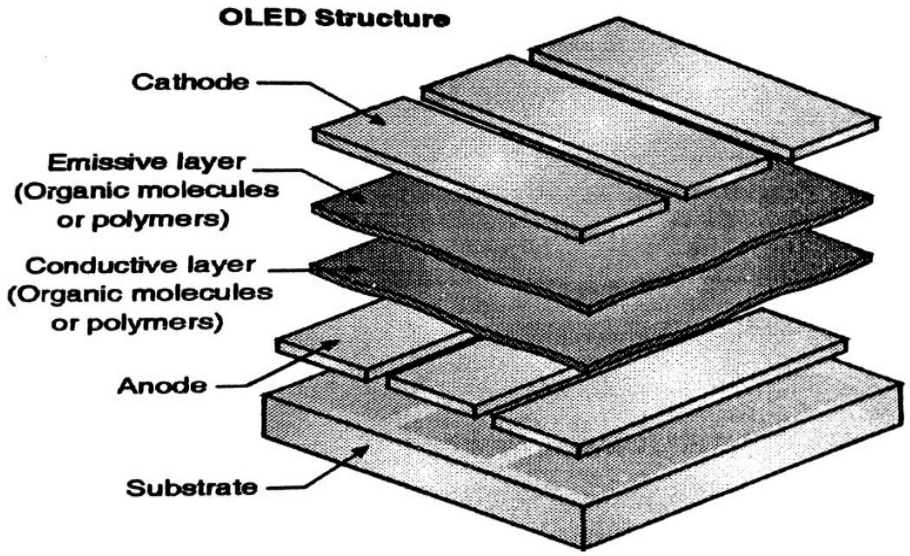
	a)	**Explain VSB transmission. State it's any four advantages.**	**4M**
	Ans:	**(Note: diagram is not mandatory, however marks can be credited for correct diagram.)** • VSB AM is used to transmit the video information in TV transmission. • AM has carrier frequency with two sidebands. • Since both sidebands contain the same information only one side band is transmitted with suppressed carrier which save the power and reduce the bandwidth. • Filter design is become easy. • Number of channel are increase. **OR** • The low video frequencies contain the most important information of the picture and any effort to completely suppress the LSB would result in phase distortion at these frequencies. This distortion will be seen by the eye as "smear" in reproduced picture. • Therefore as a compromise, only a part of the lower sideband, is suppresses, and the radiated signal then consists of a full upper side band and a carrier signal and vestige (remaining part) of the partially suppresses lower sideband. • This pattern of transmission of the modulated signal is known as Vestigial Sideband transmission.(VSB). • In 625 line system, frequencies up to 0.75MHz in the lower sideband are dully radiated. • Because of filter design difficulties it is not possible to terminate the B.W. of a signal abruptly at edges of the sidebands. As shown in figure saving of band space which results from vestigial sideband transmission. The picture signal is seen to occupy a bandwidth of 6.75MHz instead of 11MHz.  Total channel bandwidth using vestigial lower sideband. **Figure: VSB**	**2M**
		Merits of VSB: (Any 4) • Bandwidth is reduced so that more number of channels can be accommodated in a given frequency spectrum. • Power saving of 50% is possible. • Filter design becomes practicable. • More efficient. • Noise reduction.	**2M**

	b)	**Draw and describe DTH System.**	
	Ans:	 **Figure: Block diagram of DTH system** **<u>Outdoor unit:</u>** • It consists of a receiving antenna, low noise amplifier & converter the receiving antenna is parabolic reflector with a horn as the active element. The horn can be directly in front of reflector, or it may use an offset feed as shown in fig. The reflector diameter may be 0.6m for 11GHz & still smaller for K &Ka bands. • The low noise block consists of a low noise wide band amplifier followed by a convertor. The output of convertor consists of a signal of UHF frequency ranging from 950-1450MHz. • The advantage of using UHF frequency is that a low cost coaxial cable can be used as feeder from the outdoor unit to the indoor unit. • LNB cannot be kept indoor because long cable between horn & the first amplifier will cause substantial degradation of the overall noise figure of the set. **<u>Indoor unit:</u>** • The wideband signal from the LNB is fed to an RF amplifier. The amplified signal is fed to a channel selector circuit which selects the wanted band. • The selected channel is down converted to a fixed IF of 70MHz by local oscillator & mixer. IF amplifier amplifies the signal which then goes to FM detector. • The detector recovers original baseband signal, consisting of CVS & audio signal. These modulated signals are fed to the normal domestic TV receiver, which after due processing reproduces picture & sound.	**2M** **2M**
	c)	**Describe Troubleshooting procedure of colour TV receiver system.**	**4M**
	Ans:	**(Note: any other relevant procedure can be considered.)** **1.** Check the complete TV for any physical damage before connecting to mains. **2.** Observe Mains connection chord for damage and continuity.	**4M**

		3. Clean TV set with DRY nylon brush. **4.** Check out any dead animal like lizard, cockroach, Rat etc. **5.** Identify symptoms of faults. **6.** Identify the probable faulty area by symptom in given TV receiver **7.** Examine the physical faults in the section (Wire/ track open or Component broken) **8.** Check condition of fuse. **9.** Observe resistance of each active component on section. **10.** Turn on the TV and measure the voltage or current across the component **11.** Compare the reading with actual value **12.** Find the faulty component. **13.** De-solder the component **14.** Replace the old component with new component **OR** **1.** Observe given equipment vigorously **2.** Clean the equipment. **3.** Check the mains chord for wear and tear. **4.** Check the external knob for wear and tear. **5.** Open the set check for burning smell. **6.** Check for live insect, lizard, cockroach **7.** Check inside wiring and damage component, **8.** Clean the set from inside **9.** Identify fault area. **10.** Do the dry test using multimeter like fuse for open or resistor on so on. **11.** Measure corresponding voltage. **12.** Replace faulty component.	
	d)	**Explain any four basic characteristics of sound signal.**	**4M**
	Ans:	**(Note: two to three line explanation is enough foe each beat)** **<u>Level and loudness:</u>** The amplitude of a sound wave determines its loudness or volume. A larger amplitude means a louder sound, and a smaller amplitude means a softer sound. The loudness of a sound is also determined by the sensitivity of the ear. The human ear is more sensitive to some frequencies than to others. The volume we receive thus depends on both the amplitude of a sound wave and whether its frequency lies in a region where the ear is more or less sensitive. The loudness is a sensation of how strong a sound wave is at a place. It is always a relative term and is a dimensionless quantity. Loudness is measured in decibel (dB). It is given as: $L = \log(I)$, here 'I' is the intensity. **Pitch:** Pitch is tone frequency.Pitch is a characteristic of sound by which a correct note can be distinguished from a grave or a flat note. We can identify a female and male voice without seeing them. The term 'pitch' is often used in music. Pitch depends upon the frequencies of the sound wave. A note has a higher pitch when the frequency is	**1M Each**

		high and a note of low frequency has a low pitch. **Frequency response:** The audio spectrum range spans from 20 Hz to 20,000 Hz and can be effectively broken down into seven different frequency bands, with each having a different impact on the total sound. **Fidelity:** Fidelity is the quality of faithfulness or loyalty. **Sensitivity:** sensitivity It is defined as output in millivolts (or in dB below 1 volt) for the sound pressure of 1 Pa (or 10 microbars) at 1000 Hz. As the normal level of speech provides a sound pressure of I microbar ((or 0.1 Pa), the sensitivity based on this criteria for 1 microbar pressure (or 0.1 Pa) level would be one-tenth the value for 1 Pa pressure. **Selectivity:** The human ear is very sensitive to sound intensity. It can detect sound intensity as low as 10 dB below the threshold of hearing. The ear is sensitive, not to the absolute values of intensity, but to the ratios (or dB). The sound power generated by a large orchestra is a fraction of a microwatt at the softest tones and about a thousand milliwatts at the loudest ones. Similarly, speech during whispering is in picowatts, and while shouting, it is several milliwatts. It is not necessary for a sound-reproducing system to produce sound of the same magnitude of power as at the source, but the reproducing system should be capable of handling the maximum and minimum power in the same ratio.	
	e)	**State any four characteristics of Hi-Fi amplifier system.**	**4M**
	Ans:	**(NOTE: any other relevant logical point mark should be given)** **Characteristics of HI-FI amplifier:** 1. Signal to noise ratio should be better than 50dB. 2. Frequency response should be flat within +-1dB. 3. Nonlinear distortion should not be more than 1%. 4. The system should possess dynamic range of at least 8dB. 5. Stereophonic effect should be provided. 6. Environmental conditions should be such as to eliminate the external noise in listening room.	**1M each**
Q.5		**Solve any TWO :**	**12M**
	a)	**Explain OLED TV with neat labeled diagram.**	**6M**

	Ans:	 **1.** Cathode (−), **2.** Emissive Layer, **3.** Emission of radiation, **4.** Conductive Layer, **5.** Anode (+) • An organic light-emitting diode (OLED) is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. • This organic layer is situated between two electrodes; typically, at least one of these electrodes is transparent. OLEDs are used to create digital displays in devices such as television. **OR**	**6M**



Construction:

As shown in Fig. any type of OLED is made of the following components

1. An emissive layer.
2. A conducting layer.
3. A substrate.
4. Anode and cathode terminals.

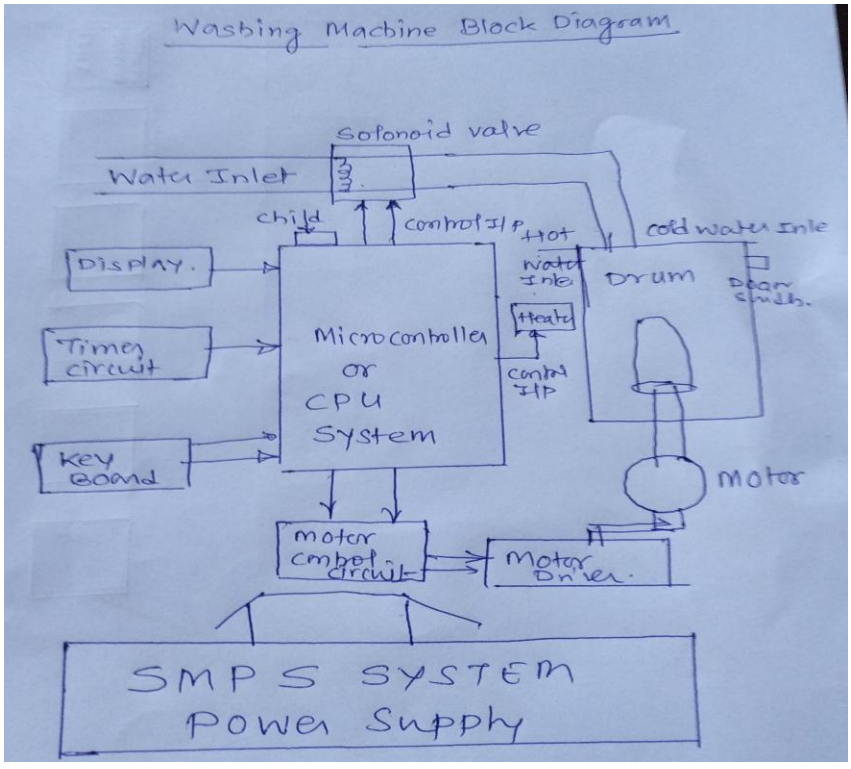
- The emissive layer and the conducting layer both are made up of organic molecules of different materials.
- These molecules has a property of conducting electricity and their conduction level can be varied substantially.
- The emissive layer is made up of organic plastic material (typically polyfluorene)
- The conducting layer is also made up of organic molecules (typically polyaniline)
- The substrate is made of plastic, foil or glass.The material used for the anode is Indium Tin Oxide, because this material is transparent to visible light.
- The cathode component is made from metals like Calcium or Aluminium and the cathode also can be transparent.

- The purpose of using various component of OLED have been listed below:

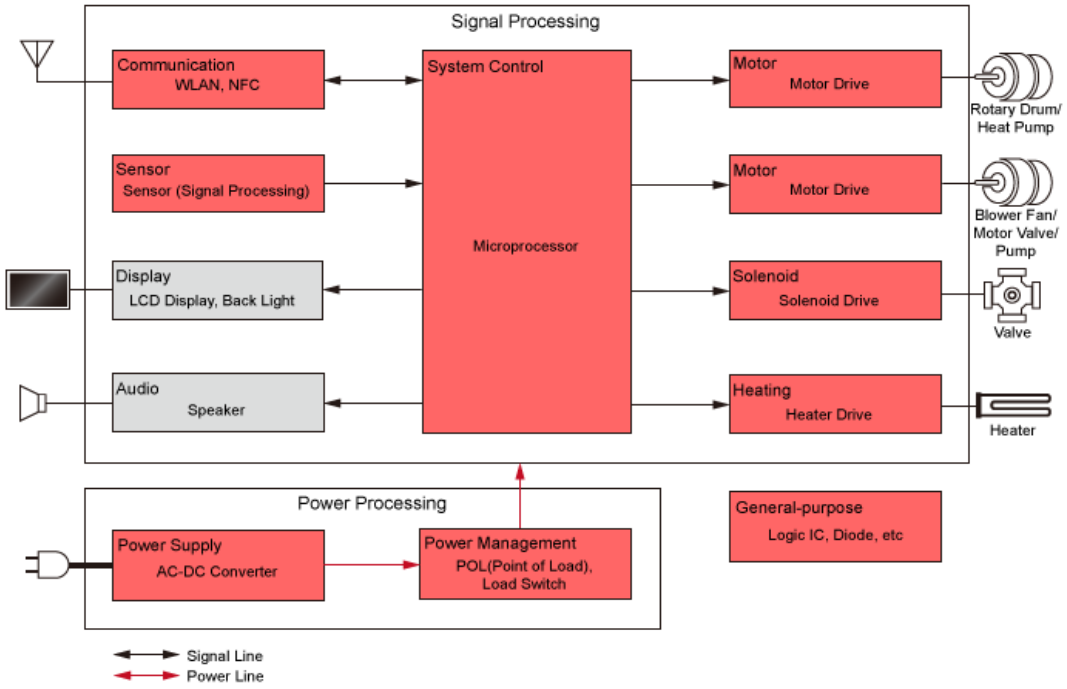
Substrate:To support the OLED
Anode:To inject more holes
Conducting layer :To carry holes from the anode
Cathode:To produce electrons
Emissive layer:To produce light.

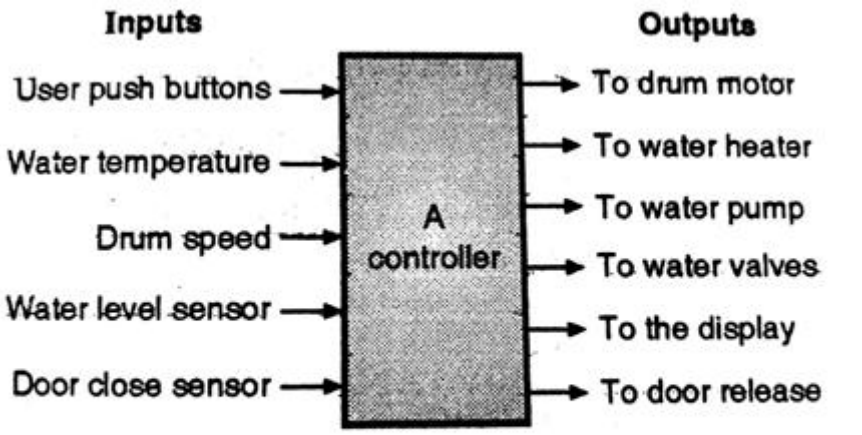
Operation:

- A positive voltage is applied to the anode with respect to cathode. Hence an electron produced by the cathode flows to anode.
- This electron is captured by the emissive layer due to which the anode withdraws an electron from the conductive layer. Thus a hole is created in the conductive layer.
- As this process continues, the conductive layer becomes positively charged (full of holes) and the emissive layer is negatively charged (full of electrons)
- Due to electrostatic forces, these electrons and holes combine together very close to the emissive layer to produce light in the emissive region.
- This is a visible light, the colour of which depends on the type of organic molecules used. A colour display can be obtained by using a number of organic layers.
- The intensity of an OLED display increases with increase in current.

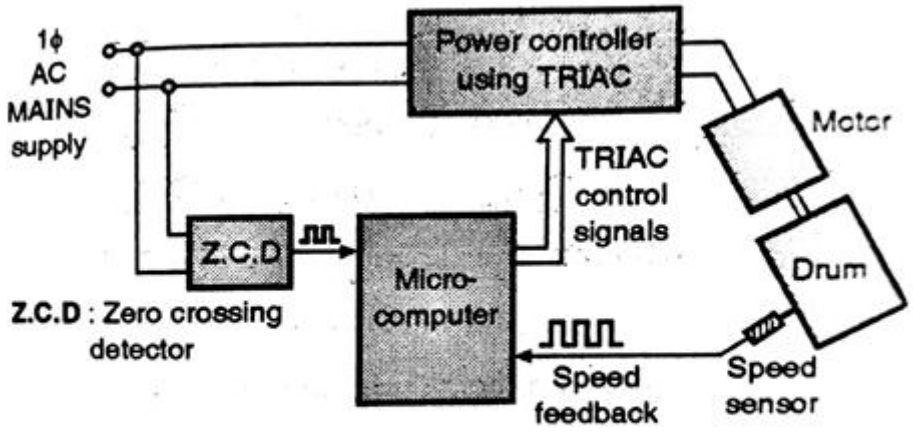
b)	**Draw block diagram of washing machine and state types of washing machine.**	**6M**
Ans:		**6M**

OR





Basic block diagram of washing machine showing different inputs and outputs

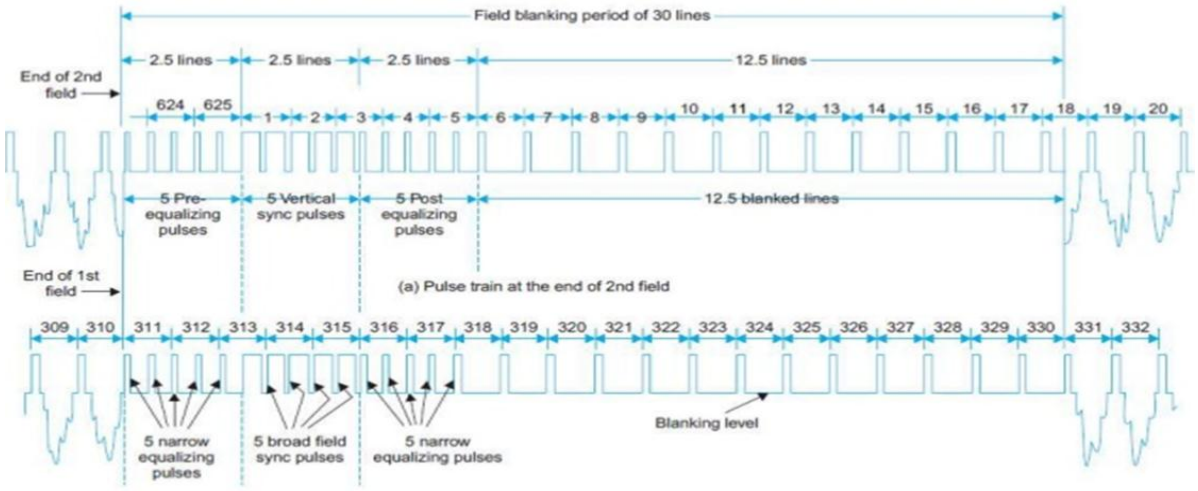


Speed control of drum

Types of Washing Machine:

i) Washers
ii) Semi-automatic
iii) Automatic

c)	**Describe why equalizing pulses are needed. Draw the vertical synchronizing pulse structure.**	**6M**
Ans:	**Description:** • To take care of the drawback which occurs on account of the half line discrepancy, five narrow pulses are added on either side of vertical sync pulses. These are known as pre-equalizing and post-equalizing pulses. • The effect of these pulses is to shift the half line discrepancy away both from the beginning and end of vertical sync pulses. • Post equalizing pulses are necessary for fast discharge of the capacitor to ensure triggering of the vertical oscillator at proper time. **OR** • The ½ line difference just prior to the start of serrated vertical pulse does not affect the horizontal deflection synchronization but it does affect the vertical synchronization and the interlaced scanning. The effect of uneven line period can be reduced by increasing the interval between the preceding line pulse and the field sync pulses. • To ensure that the vertical deflection oscillator receives the necessary triggering voltage at the same time after every field, a series of five narrow pulses 2.3 μs each, occurring at half line rhythm, are inserted before the field sync pulse. • These are called pre equalizing pulses. The width of equalizing pulse is normally half the width of horizontal sync pulses, roughly half of 4.7 μs or (2.3 μs). • The equalizing pulses inserted after the vertical synchronizing pulses are post equalizing pulses. These equalizing pulses do not disturb the operation of either oscillator, yet they permit the vertical sync pulse to occur at the correct time after every field.	**3M**

		Diagram: 	**3M**
Q.6		**Attempt any TWO:**	**12M**
	a)	**Describe vertical and horizontal resolution in brief.**	**6M**
	Ans:	**Resolution:** The scanning and reproduction of the finest details of the picture is known as resolution of TV system. **Vertical Resolution:** The ability of the scanning system to resolve picture details in vertical direction is known as **vertical resolution:** 1. Vertical resolution is a function of scanning lines into which the picture is divided in the vertical plane. 2. The maximum number of dark and white elements which can be resolved by the human eye in the vertical direction in a screen of height H decided by the number of horizontal lines into which picture is split while scanning. 3. Thus ,vertical resolution can be expressed as, Vr = Na*K Vr = Vertical resolution Na = Active number of lines K- kell factor or resolution factor **Horizontal Resolution**: The ability of the scanning system to resolve the picture details in the horizontal direction is known as **horizontal resolution.** 1. While aiming at equal vertical and horizontal resolutions and assuming the same Kell factors the effective number of alternate black and white segments (N) that get scanned in one horizontal line are- N = Na * Aspect Ratio *K	**6M**

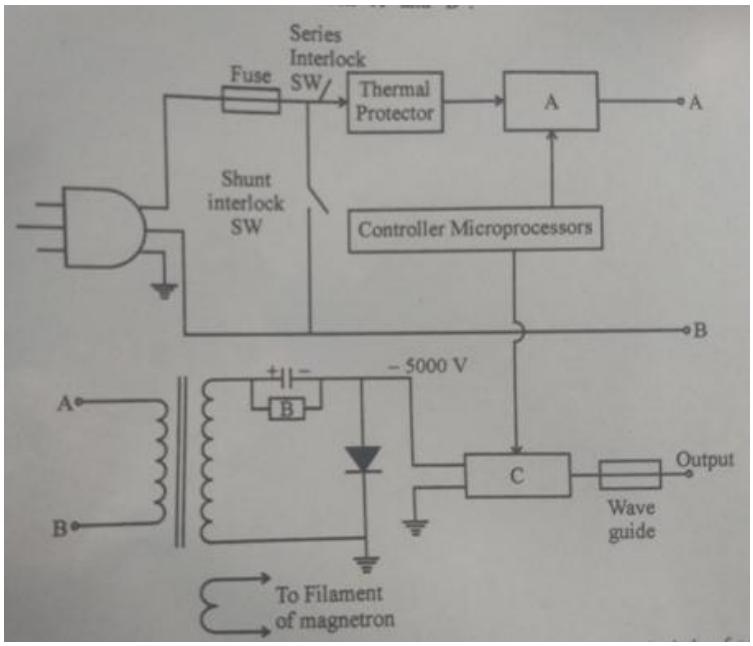
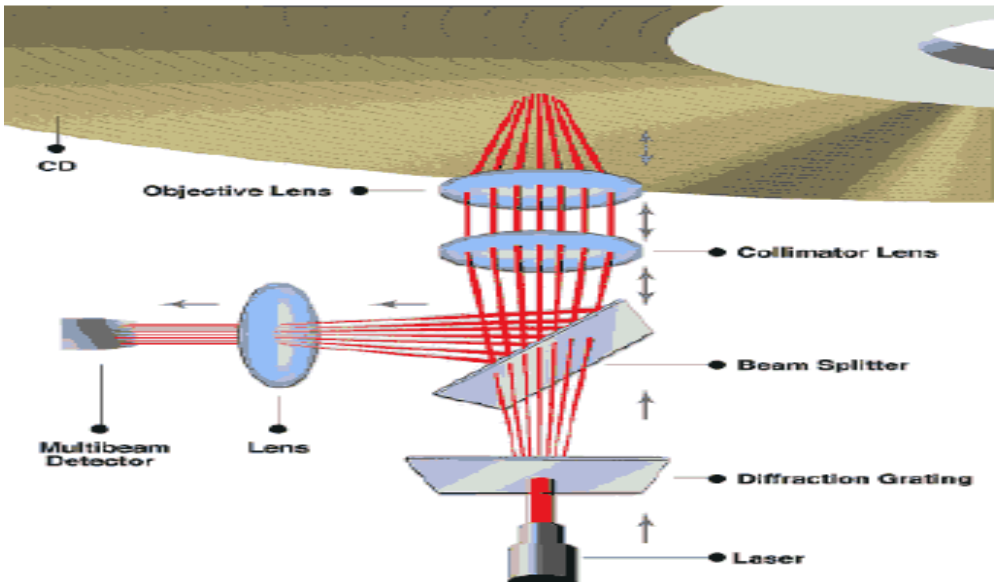
	b)	**(i)Name the block diagram shown in fig.1** **(ii)Identify the block "A","B" &"C" in given block diagram.** **(iii)State the functions of block"A" and "B".**  	**6M**
	Ans:	**(i)** Above block diagram shown in fig. no. 1 is of **Microwave Oven** **(ii)** **Block A** represents Relay or TRIAC **Block B** represents Bleeder Resister **Block C** represents Magnetron Tube **(iii)** **Function of Block A and B** Block A is a relay or TRIAC circuit through which microprocessor or controller activates the magnetron tube. Block B is a Bleeder resistor. It is a part of half wave doubler circuit consisting of R,C and D which boost the microwave voltage to high level. Capacitor C should be fully discharge before touching anything inside microwave. Hence bleeder R is connected to discharge C fully.	**6M**
	c)	**Describe the working of pick-up assembly of CD player with the help of neat sketch.**	**6M**
	Ans:	**(NOTE: Any other logical diagram can be consider)**	**3M**

Diagram:



Explanation: **3M**

The pick-up assemble consist of –

- A low power laser diode to illuminate the CD tracks.
- Lens and prism arrangement to direct the laser beam to the CD surface and to direct the reflected laser beam towards photodiode array.
- A photodiode array to obtain data, focus and tracking signal from the reflected laser beam.
- Focus and tracking coils to focus the beam to the CD surface and to move the assembly to proper track across the disc surface.
- Some optical units do not contain the tracking coil, for example, the single-beam radial tracking assembly, this is explained in latter sections.
- Optical arrangement in a single-beam radial tracking pick-up assembly :
- In the optical pickup unit, the laser diode emits laser beam from a small point into an elliptical or conical distribution. This beam is passed through various prism and lens to form a very small diameter light beam on the disc surface at the ce77nter of the track.
- The objective lens is controlled by the tracking and focusing coil to keep the beam focused on the CD and to keep the condensed beam at the center of the track.
- This laser beam is reflected back by the flat area and the pits on the disc surface. This reflected beam is applied to a group of photodiodes through objectives lens, collamination lens and some prism arrangement.