1.justify the choice of rectangular frame with width to height ratio=4/3 for television transmission and reception

Answer : The choice of a rectangular frame with a width to height ratio of 4:3 for television transmission and reception is rooted in historical and technical reasons.
Historically, the 4:3 aspect ratio was established in the early days of television broadcasting, around the 1950s. At the time, television sets were primarily designed with circular or square screens, but rectangular screens were becoming more popular. The 4:3 aspect ratio was chosen as a compromise between the two shapes, providing a rectangular shape that could be easily viewed on both circular and square screens without losing any important visual information
From a technical standpoint, the 4:3 aspect ratio was also advantageous because it allowed for efficient use of the available bandwidth for transmission. In the early days of television broadcasting, bandwidth was limited, and it was important to maximize the amount of visual information that could be transmitted within the available bandwidth. The 4:3 aspect ratio was found to be the most efficient shape for transmitting a high-quality image while still keeping the necessary bandwidth requirements low.
While newer digital technologies have allowed for the use of different aspect ratios, such as the 16:9 widescreen aspect ratio commonly used today, the 4:3 aspect ratio remains an important part of television history and is still used in some applications today.
Additionally, many people have a nostalgic attachment to the 4:3 aspect ratio, as it was the standard for television for many years.
The choice of aspect ratio = 4/3 is having some reasons,
In human affairs most of the motion occurs in the horizontal plane, so the larger width is desirable.
The eyes can view with more ease and comport when the width of a picture is more than its height.
(iii)The usage of rectangular frame in motion pictures with a width to height ratio of 4/3 is another reason for adopting the shape. This enables direct television transmission of film programs without wastage of any film or area.

2.Justify the choice 625 lines of TV transmission

Answer: 625 lines of TV transmission was a standard choice for analog television systems in many countries, including Europe and Australia, because it offered a higher quality compared to the earlier 405-line system.
The 625 lines of each picture or frame are divided into sets of 312.5. To achieve the horizontal sweep oscillator is made to work at a frequency of 15625Hz (312.5 * 50Hz = 15625Hz) to scan the same number of lines per frame (we know that there are 25 frames) so 15625 / 25 = 625. Means line frequency divide by total number of frames we get 625 number of lines.
Here are some reasons why 625 lines was chosen as the standard:
Improved image quality: With 625 lines, the TV image had more lines of resolution, resulting in a sharper, more detailed picture.
Compatibility with existing systems: The 625-line system was designed to be backward compatible with the existing 405-line system, making it easier for broadcasters to transition to the new standard without having to replace all their equipment at once.
International standardization: In the 1950s and 1960s, there was a push towards standardizing television broadcasting internationally. The 625-line system was adopted by many European countries, which helped to establish it as a de facto international standard.
Transmission efficiency: The 625-line system used interlaced scanning, which allowed for more efficient use of the available bandwidth, and made it possible to transmit a higher

quality image over the same amount of spectrum. Future-proofing: When the 625-line system was introduced, it was seen as a forward looking standard that would be able to accommodate future improvements in technology, such as color broadcasting and stereo sound.
Overall, the choice of 625 lines for TV transmission was a result of several factors, including image quality, compatibility, international standardization, transmission efficiency, and future-proofing. While the technology has since been surpassed by digital transmission systems, it was an important milestone in the development of television broadcasting.

3.why are synchronizing pulses transmitted along with the Picture signal?

Answer: Synchronizing pulses are transmitted along with the picture signal in order to ensure that the picture is displayed correctly on the receiving end. These pulses help the receiver to synchronize its scanning process with the scanning process used by the transmitter, so that the image can be reconstructed accurately.
When a video signal is transmitted, it is divided into horizontal lines and each line is scanned one at a time from left to right. The synchronizing pulses are added to the signal to mark the beginning and end of each line, as well as the beginning and end of each frame. This allows the receiver to accurately determine when each line and frame should begin and end, and ensures that the picture is displayed correctly without any distortion.
Without synchronizing pulses, the picture may appear distorted, with lines being misplaced or overlapping, or the picture may roll vertically. Therefore, transmitting synchronizing pulses along with the picture signal is essential for ensuring that the picture is displayed correctly on the receiving end.

4.what is flicker and how it is solved in television scanning?

Answer: Flicker refers to the visible fluctuation in brightness or brightness changes of a display device, such as a television screen, due to the way the image is refreshed or scanned.
In a television scanning process, the screen is redrawn many times per second (usually 50 or 60 times per second). If the refresh rate is too low, the eye can perceive a flicker or flashing effect, which can cause eye strain, headaches, and visual discomfort.
How will you solve the flickering problem?
The flickering problem is solved in motion pictures by showing each picture twice. Hence 48 views of the scene are shown per second although they are still the same 24 pictures frames per second. As a result of the increased blanking rate, flicker is removed. In TV, Interlaced scanning is used to avoid flicker

5.How is the illusion of continuity is created in TV pictures.?

Answer: An illusion of continuity is created while televising pictures, due to the persistence of vision or storage characteristics of human eye.

6.Why the frame reception rate been chosen to be 25 and not 24 as in motion pictures?

Answer: It is done by operating the vertical field at 50Hz. So that the two successive interlaced scans, each at 25 Hz rate make up the complete picture frame.
This keeps the line scanning stopped down, as only 312 ½ lines are scanned in 1/50 second.
The 625 lines of full pictures are scanned in 1/25 second.

7.Show that the 625-B TV system is only marginally superior to the 525 line American system.

Answer: The 625-B TV system and the 525-line American system refer to different television broadcasting standards, which differ in several ways, such as the number of lines, the frame rate, and the bandwidth.

The 625-B TV system, also known as the PAL system, is used in many countries, including Europe and parts of Asia. It has 625 lines, a frame rate of 25 frames per second, and a bandwidth of 6 MHz. The 525-line American system, also known as the NTSC system, is used primarily in North and South America and has 525 lines, a frame rate of 30 frames per second, and a bandwidth of 6 MHz.

When comparing the two systems, there are a few factors to consider:

Resolution: The 625-B TV system has a higher resolution due to the higher number of lines. However, the difference in resolution may not be noticeable to the average viewer unless they are viewing the content on a large screen.

Frame rate: The 525-line American system has a higher frame rate, which means that it can display fast-moving content more smoothly. This is particularly noticeable in sports or action scenes.

Color accuracy: The 625-B TV system is known for its better color accuracy, which is due to the way it encodes color information. However, the difference in color accuracy may not be noticeable to the average viewer unless they are viewing content with very specific colors.

Overall, the 625-B TV system and the 525-line American system have their strengths and weaknesses, and which system is superior depends on the specific context and application.

Therefore, it can be concluded that the 625-B TV system is only marginally superior to the 525-line American system, as the differences between the two systems are not significant enough to make one system vastly superior to the other

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8.What is meant by equal vertical and horizontal 'resolution ?' Derive an expression for the high- est modulating frequency in a television system and show that it is nearly 5 MHz. in the 625-B monochrome system.

Answer: Equal vertical and horizontal resolution means that the number of lines in the vertical direction is equal to the number of pixels in the horizontal direction. In a television system, the resolution is typically expressed as the number of lines and the number of pixels per line. For example, a resolution of 640x480 means that there are 640 pixels in each line and 480 lines in the vertical direction.

The highest modulating frequency in a television system is determined by the bandwidth of the video signal. In the 625-B monochrome system, the bandwidth of the vedio signal is 5 MHz

To derive the expression for the highest modulating frequency, we start with the fact that the bandwidth of a signal is related to the rise time of the signal. The rise time is the time it takes for the signal to go from 10% to 90% of its maximum value. The bandwidth is then given by:

Bandwidth = 0.35 / rise time

In a television system, the rise time is related to the number of lines and the horizontal scanning frequency. The horizontal scanning frequency is the rate at which the electron beam scans across the screen from left to right. In the 625-B monochrome system, the horizontal scanning frequency is 15.625 kHz, and there are 625 lines in the vertical direction.

The rise time is given by:
rise time = (1/2)*(1/horizontal scanning frequency)*(1/number of lines)
Substituting these values into the expression for bandwidth, we get:
Bandwidth = 0.35 / [(1/2)*(1/horizontal scanning frequency)*(1/number of lines)]
Simplifying this expression, we get:
Bandwidth = 2.8 * horizontal scanning frequency * number of lines
Substituting the values for the 625-B monochrome system, we get:
Bandwidth = 2.8 * 15.625 kHz * 625 = 5 MHz
Therefore, the highest modulating frequency in the 625-B monochrome system is nearly 5 MHz

9.Justify the choice of 625 lines for TV transmission. Why is the total number of lines kept odd in all television systems ? What is the significance of choosing the number of lines as 625 and not 623 or 627 ?

Answer: The choice of 625 lines for TV transmission is due to historical reasons. In the early days of television, many countries were developing their own television systems, and they had to make choices about the number of lines, the frame rate, and other parameters. In Europe, the first television standard was developed by the BBC in the 1930s, and it used 405 lines. However, this standard was not compatible with the American system, which used 525 lines, so a new standard was needed.8The new European standard, called PAL (Phase Alternating Line), was developed in the 1960s and used 625 lines. The choice of 625 lines was partly based on technical considerations, such as the need for a higher resolution to accommodate the PAL color encoding system. However, it was also influenced by political and economic factors, such as the desire to create a European standard that could compete with the American system.
The total number of lines is kept odd in all television systems to avoid the problem of interlace flicker. Interlacing is a technique used in television to reduce the bandwidth required for transmission by dividing each frame into two fields of alternating lines. However, if the number of lines is even, the two fields will be offset by half a line, and this can cause a visible flicker when the image is displayed on a screen. By using an odd number of lines, the two fields are offset by a whole line, and the flicker is eliminated.
The significance of choosing the number of lines as 625 and not 623 or 627 is mainly due to technical reasons. The PAL system uses a color encoding technique called phase alternation, which requires a specific number of lines to be used to avoid interference between the color and brightness information. The number 625 was chosen as the nearest multiple of 25 that would accommodate this requirement. Similarly, the choice of 525 lines for the American system was also based on technical considerations, such as the need to accommodate the frequency of the power grid (60 Hz).

10.Compare Between AM and FM received

Answer: AM (amplitude modulation) and FM (frequency modulation) are two methods of

modulating a carrier signal with a message signal. The main difference between AM and FM lies in how the message signal is used to modulate the carrier signal. Here are some key differences between AM and FM in terms of their received signals:
Noise Resistance: FM is generally more resistant to noise than AM. In an AM signal, the amplitude of the carrier wave is modulated by the message signal, and any noise that is introduced will affect the amplitude of the signal, causing distortion. In contrast, FM is based on frequency modulation, so changes in amplitude have little effect on the signal. As a result, FM signals tend to be clearer and less susceptible to interference
Bandwidth: FM signals typically require more bandwidth than AM signals. This is because the frequency of an FM signal is modulated, resulting in a signal that varies in frequency. In contrast, the amplitude of an AM signal is modulated, resulting in a signal that varies in amplitude. Because the frequency range of an FM signal is wider, it requires more bandwidth to transmit.
Signal Strength: AM signals tend to have a longer range than FM signals. This is because AM signals can be easily reflected and refracted by objects in the environment, allowing them to travel longer distances. FM signals, on the other hand, tend to travel in a straight line and can be blocked by obstacles such as buildings and hills.
Audio Quality: FM signals generally provide higher audio quality than AM signals. This is because FM signals are less susceptible to distortion and noise than AM signals, resulting in clearer and more accurate reproduction of the original message signal.
In summary, both AM and FM have their strengths and weaknesses, and the choice of modulation method depends on the specific application and requirements of the communication system.

11.Why is FM preferred to AM for sound signal transmission

Answer: Frequency Modulation (FM) is preferred to Amplitude Modulation (AM) for sound signal transmission for several reasons:
Frequency Modulation (FM) is preferred to Amplitude Modulation (AM) for sound signal transmission for several reasons:
Higher sound quality: FM signals are able to transmit a wider range of frequencies than AM signals, which results in higher sound quality. FM signals can reproduce higher frequencies more accurately, resulting in clearer, more natural-sounding audio.
Reduced noise: FM signals are less prone to noise than AM signals. This is because noise primarily affects the amplitude of the signal, and FM signals do not vary in amplitude. Therefore, FM signals are able to maintain a consistent signal-to-noise ratio, resulting in clearer audio
Greater range: FM signals have a greater range than AM signals, which means they can be transmitted over longer distances without the need for signal boosters or repeaters. This is because FM signals are less affected by changes in the atmosphere or terrain, which can cause signal degradation in AM transmissions
Overall, FM is a more reliable and efficient method of sound signal transmission

than AM, and is therefore preferred in most applications where high-quality sound transmission is required.

12. What is synchronization?

Answer:In general, synchronizations is the process in which the signals are transmitted and received in accordance with the clock pulses. In synchronization of Televisiontransmitter, a sharp pulse is sent between each video signal line so that to maintain the impeccable transmitter-receiver synchronization

13. Explain the basic monochrome television receiver with block diagram

Answer: A basic monochrome television receiver, also known as a black-and-white television receiver, is a device that receives broadcast signals and displays images in shades of gray on a screen. Here is a basic block diagram of a monochrome television receiver: Antenna: The antenna receives the broadcast signal, which is a high-frequency electromagnetic wave. The signal is then sent to the tuner. Tuner: The tuner selects the desired frequency from the broadcast signal and amplifies it. The amplified signal is then sent to the intermediate frequency (IF) stage. IF Stage: The IF stage converts the high-frequency signal to a lower frequency signal, making it easier to process. The signal is then filtered and amplified before being sent to the video detector. Video Detector: The video detector demodulates the video signal, which is a combination of the picture and sound information. The signal is then separated into its components: the picture signal and the sound signal. Amplifier: The picture signal is amplified by a video amplifier and sent to the video output stage. The sound signal is sent to the sound amplifier. Video Output Stage: The video output stage amplifies the picture signal and sends it to the cathode ray tube (CRT). The CRT creates the image on the screen by using an electron beam that scans the screen from left to right and top to bottom. Sound Amplifier: The sound amplifier amplifies the sound signal and sends it to the speaker. Power Supply: The power supply provides the necessary voltages and currents to operate the various components of the television receiver. Overall, this block diagram represents the basic components and functions of a monochrome television receiver.