

### 1. Lab এ কোন type receiver use করা হয়েছে?

Superheterodyne Receiver

### 2. AM Receiver Intermediate frequency-

455 kHz

### 3. Scanning?

Scanning is the conversion of the charge picture formed within the TV camera Tube into a variable electrical signal.

### 4. Beam থেকে electron বের হচ্ছে কেন?

In television cameras, the focused electron beam is scanned across the target surface of the camera tube in a pattern that corresponds to the image being captured. This process generates a varying electron density pattern, which can be converted into an electrical signal representing the image.

### 5. Video signal

A video signal is an electrical or optical representation of visual information that conveys images or moving pictures. The primary purpose of a video signal is to reproduce images and motion for human viewing.

Baseband freq. range 0-4 MHz

### 6. What is Video signal in Monochrome TV?

In monochrome (black and white) television, the video signal is a key component that carries the luminance information necessary to generate images on the screen. The video signal in monochrome TV represents the intensity or brightness of each pixel in the image, allowing the television to display varying shades of gray that together form a complete picture.

### 7. video signal frequency range-

30MHz-300MHz

### 8. Camera tube-

A TV camera tube is a transducer which converts optical image into the electrical current or voltage signals on the basis of photoconductive principle.

### 9. Picture tube-

A picture tube, commonly known as a cathode ray tube (CRT), Displays images by emitting an electron beam onto a phosphorescent screen, creating the visual image seen on the screen.

### \*\*\* Difference-

Camera Tube: Captures visual scenes and converts them into electronic signals for transmission or recording.

Picture Tube (CRT): Displays images by emitting an electron beam onto a phosphorescent screen, creating the visual image seen on the screen.

## 10. Picture tube freq. range-

Horizontal Scanning Frequency: 15.7 kHz (NTSC) or 15.625 kHz (PAL). For higher-resolution CRT monitors, this frequency could range from around 30 kHz to 130 kHz or more.

Vertical Scanning Frequency: 60 Hz (NTSC) or 50 Hz (PAL).

## 11. Frequency multiplier in FM transmitter

Several stages of frequency multiplier are used to increase the operating frequency.

## 12. what is Harmonic generator? where it is used?

A harmonic generator is a circuit that produces harmonics, which are integer multiples of a fundamental frequency.

A harmonic generator typically takes an input signal and subjects it to a non-linear process which causes the generation of harmonics. When you input a pure sine wave at a fundamental frequency ( $f$ ), the harmonic generator produces output signals at frequencies like  $2f$ ,  $3f$ ,  $4f$ , and so on.

## 13. Why Vestigial sideband is used in television? What happens if we use Double sideband in television?

The information stored in LSB (lower side band) and USB (upper side band) is similar, and the bandwidth requirement for television signal (audio + video) is large. To reduce the transmitted power wastage, it is preferred to transmit a single band i.e., either LSB or USB.

Now, SSB cannot be used because of these 2 reasons:

- Receiver of SSB is more complex.
- Some part of LSB is shared with USB or vice-versa which creates distortion.

And, DSB cannot be used because of the requirement of large bandwidth in television signal.

To overcome the above-mentioned constraints, we use VSB i.e., vestigial side band modulation, in which Vestigial means 'extra'. To avoid the loss of information due to the presence of single side band, an extra little amount of band is added to it.

**Basically, VSB modulation lies between SSB and DSB modulation, whose purpose is to save the bandwidth, to reduce the transmitted power and to avoid the distortion.**

## 14. T signal in TV-

Combination of Y & C signal, aka Color Plexed Signal

## 15. Why 3.58 MHz is the color sub carrier frequency in TV?

- so that the color information would not conflict with the luminance channel on the main frequency.

## 16. Video baseband signal frequency-

6 MHz (bandwidth 60-66 MHz)

## 17. Y signal frequency-

3.2 MHz

**18.**

**19. A tv channel has frequency range of 70-76Khz. What would be the frequency sound carrier signal?**

Given the frequency range of the TV channel as 70-76 MHz, in this case, the midpoint of the frequency range (73 kHz) would be the video carrier frequency.

If we calculate the sound carrier frequency based on the given video carrier frequency (73 MHz):

$$\begin{aligned}\text{Sound Carrier Frequency} &= \text{Video Carrier Frequency} + 4.5 \text{ MHz} \\ &= 73 \text{ MHz} + 4.5 \text{ MHz}\end{aligned}$$

**20. Chrominance signal frequency-**

3.58 MHz

**21. What is Complimentary color?**

Complementary colors are pairs of colors which, when combined or mixed, cancel each other out by producing a grayscale color like white or black. The primary complementary colors are:

Red and Cyan, Green and Magenta, Blue and Yellow

**22. What should be the voltage level of RGB to produce white color at the receiver end?**

**23. Picture nominance frequency at FM transmitter-**

61.25 MHz

**24. 3.58 MHz এ কেন generate করি? FM এর frequency range এর মধ্যে কেন generate করি না কেন?**

**25. Frequency drift-**

An undesired progressive change in frequency with time. Frequency drift can be caused by instability in the oscillator and environmental changes.

**26. Freq. Scintillation-**

If the freq. of master osci. changes abruptly. It also may occur if the crystal osci. has effective reactance change/loading effect. It can be removed by 'Buffer amplifier'

**\*\*\* Freq. draft and scintillation, both are undesired.**

**27. Advantages of Superheterodyne receiver-**

The superheterodyne receiver offers better selectivity, sensitivity, and image rejection compared to the TRF receiver.

### 28. Intermediate frequency for AM & FM Receiver-

455 kHz for AM receivers and 10.7 MHz for FM receivers

### 29. How many electrodes in monochrome tv? And in Color TV?

Color=3; Mono=1

### 30. কিভাবে Y & C signal পাই?

### 31. Frequency drift কোথায় হয়? Transmitter এ নাকি receiver এ? Transmitter এর কোন জায়গায় হতে পারে?

An undesired progressive change in frequency with time. Frequency drift can be caused by instability in the oscillator and environmental changes.

### 32. Superheterodyne receiver এর advantage-

The superheterodyne receiver offers better selectivity, sensitivity, and image rejection compared to the TRF receiver.

### 33. TRF receiver এ কি এমন সমস্যা ছিল যার জন্য আমরা superheterodyne receiver use করি?

1. Instability of the receiver.
2. Insufficient selectivity at high frequencies and poor adjacent channel rejection.
3. Bandwidth variation over the tuning range.

### 34. Image frequency-

In heterodyne receivers, an image frequency is an undesired input frequency equal to the station frequency plus (or minus) twice the intermediate frequency.

বাড়লে tracking error বাড়বে। আবার বেশি ই কমে গেলে BW কমবে।

### 35. Image frequency rejection ratio?

The image rejection ratio, or image frequency rejection ratio, is the ratio of the intermediate-frequency (IF) signal level produced by the desired input frequency to that produced by the image frequency.

The image rejection ratio is usually expressed in dB. Occurs in preselector. Ideally 42dB, practically, 60dB.

### 36. How to increase frequency rejection ratio of receiver? How?

By using RF amp.

### 37. Describe Color TV trainer-

### 38. Composite (something) .....Unclear question

### 39. In TV transmitter, what does the amplitude of the video signal depend upon?

**40. কোন instant এ picture signal পাইলাম, তার amplitude বেশি পেয়েছি, এটার corresponding scene টা কেমন হবে? (For Monochrome TV)**

Bright

**41. What is the bandwidth for FM modulating wave?**

88-108 MHz

**42. কোন channel থেকে FM signal transmit হচ্ছে. Bandwidth কত?**

**43. কোন specific frequency signal generate করতে হবে. ধরি, 100 KHz এর signal generate করতে হবে. Generate করা যাবে কি যাবে না? কিভাবে generate করব? কি ধরনের oscillator use করি আমরা 100 KHz কে যদি 200 KHz এ convert করতে চাই**

**44. Fly wheel effect-**

Continuous oscillation from the Tank ckt.

**45. Carrier signal কিভাবে generate করি? কি oscillator use করি?**

Master Osci./Crystal Osci.; Carrier freq. যত বেশি, Osci. Gen. freq. তত unstable. Gen. freq. কে nonlinear mixer/harmonic gen. দিয়ে multiply করা হয়।

**46. Mixer-**

combining the incoming RF signal with a local oscillator signal to produce a beat frequency or intermediate frequency (IF) signal.

**47. 600 KHz এর একটা radio station কে tune করা হচ্ছে AM receiver এ? Local oscillator frequency কত?**

**48. Tune receiver frequency problem?**

1. Instability of the receiver.
2. Insufficient selectivity at high frequencies and poor adjacent channel rejection.
3. Bandwidth variation over the tuning range.

**49. Problem টা কিভাবে superheterodyne এ solve হয়? Intermediate এ কি হয়?**

Because the detector and amplifiers of a superheterodyne receiver can be designed to amplify only intermediate frequency (IF), this type of receiver is more selective and offer high fidelity (exact reproduction quality of the transmitted signal). In TRF receiver, amplification is not constant over the tuning range.

**50. FM intermediate frequency-**

10.7 MHz

\*\*\*Local Osci. For FM= 90 MHz+ IF

**51. Frequency drift? Where? When?**

Frequency drift can be caused by instability in the oscillator and environmental changes.

**52. Monochrome transmitter থেকে video signal এর color transmitter থেকে যে video signal, দুইটা কি same? নাকি আলাদা?**

**53. Brightness এর information কোন signal এর মধ্যে থাকে?**

**54. Luminance signal এর amplitude maximum & minimum হলে output কি?**

Max=black; Min=White

**55. Composite video signal এর amplitude maximum হলে scene কেমন?**

**56. Horizontal & vertical scanning line কি? কেন use করা হয়?**

Horizontal scanning involves moving the electron beam from left to right to scan one line of the image.

Vertical scanning is accomplished by moving the electron beam down the screen after each horizontal scan is completed

**57. Scanning কেন করা হয়? Scanning circuit এর কাজ কি? কেন electron beam কে move করা হয়?**

Scanning is essential to convert the continuous variations in brightness and color of a scene into an electrical signal that can be transmitted, received, and displayed as a coherent and recognizable image on a television screen.

**58. Scanning ছাড়া কি করা যেতো না?**

**59. Camera tube কিভাবে কাজ করবে?**

**60. Harmonic generator কোথায় use করা হয়? কেন?**

**61. Color plexed signal-**

Combination of Y & C signal

**62. Color sub carrier signal? Frequency?**

**63. AM modulation এ Msg signal কই থেকে আসবে?**

**64. AM bandwidth?**

**66. TV channel bandwidth?**

**68. Color TV তে fault simulate করছিলাম? সেখানে একটা fault ছিল যে Screen এ শুধু মাত্র black & white picture দেখতে পাচ্ছিলাম। কখন এরকম fault হবে? কোথায় prblm হলে এ fault হবে?**

**69. Camera tube কোথায় থাকে?**

**70. Picture tube কোথায় থাকে?**

**71. AM band separation= 10 kHz**

**FM band separation= 150 kHz**

So, if one station is 90 MHz, then next adjacent station will be (90 MHz+150 kHz)

**72. Difference betn AM & FM Rx is-**

‘Limiter’; -- Limits amp.; improves SNR

**73. Photoconductive layer-**

Dark--layer resistance high+ intensity low

Light--layer resistance low+ intensity high

**74. Picture element-**

Object এর corresponding smallest unit, aka Pixel. More the pixel, better the picture.

**75. Why use e- beam?**

Resistance/ Voltage change কোন corresponding picture element এর জন্য তা identify করতে।

**76. Monochrome TV-**

More intense light, brighter picture. Carrier freq. 61.25 MHz

**77. Chrominance (C signal)-**

More amp., more color saturation. Carrier freq. 61.25 MHz + 3.58 MHz

**\*\*\* Sound** Carrier freq. 61.25 MHz + 4.5 MHz

**78. Dichroic mirror-**

Works as a mirror & optical filter at the same time.

**\*\*\* If the DC valu of video signal is-** nearly 12.5%==Screen brighter

“ 75%== “ dark

\*\*\* Distance bet. 75% line & DC level is **Pedestal Height**. More it is, brighter will be the signal.

### **79. RGB freq. range-**

0-0.5 MHz