COLOUR TELEVISION SYSTEMS

1. What are the characteristics of colour signal to specify visual information?

The characteristics of colour signal to specify visual information are

1) Luminance
2) Hue or tint
3) Saturation

2. What do you understand by Hue?

Hue or tint can be defined as the predominant spectral colour of the received light. The colour of any object is distinguished by its hue or tint.

3. Define Luminance.

Luminance is defined as the amount of light intensity as perceived by the eye regardless of the colour.

4. What do you meant by saturation?

Saturation refers to the spectral purity of the colour light. It indicates the degree by which the colour is diluted by white.

5. What is Chromaticity diagram?

Chromaticity diagram is a graphical representation of primary colours and their mixtures in a convenient space coordinates. Based on the principle of tristimulus value, that the white colour is formed by mixing 30% red, 59% green and 11% blue, these diagrams are drawn. It will be in the shape of a Horse shoe.

6. List any three requirements to be satisfied for compatibility in television systems.

a. It should have the same bandwidth as the corresponding monochrome signal.
b. The colour signal should have the same brightness information as that of monochrome signal.
c. The location and spacing of the picture and sound carrier frequencies should remain the same.

7. What is additive mixing?

All light sensations to the eye are spitted in to three main colour groups namely red, blue and green. The optic nerve system integrates the different colour Impressions in accordance with the curve to perceive the actual colour of the Object.

8. State Grassman's law.

The property of the eye of producing a response which depends on the algebraic sum of the blue, red and green inputs is called Grassman's law.

9. Explain the significance of generating colour difference signals.

Colour difference signals are generated to avoid the separate transmission of R, G, B signals.

10. Why is (G-y) not suitable for transmission?

1) The proportion of G is large in luminance signal; hence magnitude of (G-Y) is relatively small so it requires amplifiers at the receiving end.
2) It affects the signal to noise ratio at the transmitting end.

11. What is gamma correction?

A colour camera is used develop three voltages proportional to red, green and blue Colour contents of the picture. These voltages are represented as R, G, and B. A Correction is applied to these voltages to compensate for any nonlinearity of the System and that of the picture tube. This is called gamma correction. i.e. The camera Tube output voltage amplitudes are normalized to I V p-p level.

12. What do you mean by compatibility?

Compatibility means that a colour TV signal can produce a black and white Picture on a monochrome receiver and signals from a black and white system can provide a monochrome picture on a colour receiver.

13. What do you meant by Reverse compatibility?

A colour TV receiver must able to produce a black and white picture using the normal monochrome signal. This is called Reverse compatibility.

14. What are Primary colours?

The three primary colours are Red, Green and Blue. These are called primary colours because any different colours can be produced by properly mixing these three colours.

15. What are complementary colours?

Cyan, Magenta and Yellow are called complementary colours. These colours are produced by properly mixing the primary colours.

16. Mention the different types of colour picture tubes.

The different types of colour picture tubes available are

1) Delta Gun colour picture tube
2) Precision in line or Gun in line colour picture tube
3) Trinitron or cathode in line colour picture tube

17. How the three electron guns are arranged in Delta gun colour picture tube?

In Delta Gun colour picture tube the three electron guns are spaced equally at 120˚ with each other. They are tilted inward with respect to the axis of the tube. The three guns are in the three corners of a Delta.

18. What do you meant by colour burst?

In PAL system the two carrier components are suppressed in the balanced quadrature modulator it is necessary to regenerate at the receiver for Demodulation .For this, 8 to 10 cycles of the colour sub carrier oscillator output at the encoder are transmitted along with other sync pulses. This sample of the colour sub carrier called colour burst, is placed at the back porch of each horizontal blanking pulse pedestal.

19. What are the types of colour mixing available?

The types of colour mixings are

1) Additive colour mixing
2) Subtractive colour mixing

20. What are the drawbacks in a Delta gun tube?

1) Convergence is difficult
2) Focus cannot be sharp over the entire screen.
3) Electron transparency of the mask is very low (about 20% only)

21. Why Trinitron picture tube is superior to Delta gun and PIL picture tube?

1) Construction is simple.
2) Bandwidth is more.
3) Electron transparency is more.
4) Vertical misconvergence is impossible.

22. What do you meant by Degaussing?

Degaussing means 'Demagnetizing'. It is used to remove magnetic flux from the magnetized metal parts.

23. How colour purity is achieved in colour picture tube?

In colour picture tube, to get pure colour each electron beam should land at the centre of the phosphor dot. This precise, alignment of electron beam is done by purity magnets.

24. How pincushion error is eliminates in Colour picture tube?

It is not done by permanent magnets. Instead, a dynamic connection method is employed. This connection automatically & increases the horizontal width & vertical size of the shrunken raster due to pincushion distortion.

25. What is Grey scale tracking?

The adjustments to be made in the picture tube of the receivers so that Monochrome information is reproduced correctly without any colour tint for all the settings of the contrast control is known as Grey scale tracking.

26. What are the needs for Grey scale tracking?

1. The efficiencies of 3 colour phosphors are not same.
2. Electron guns for different colours do not have identical characteristics & cut off points.

27. Mention the adjustments to be made for Grey scale tracking? The adjustments to be made for Grey scale tracking are

    1) Adjustment of low lights
    2) Adjustment of High lights

28. What do you meant by Convergence?

Convergence is the technique used to bring the three beams together, so that they hit the same part of the screen at the same to produce three coincident rasters on the screen.

29. Why convergence error occurs in colour picture tube?

Convergence error occurs due to

    1) Non uniformity in the deflection field
    2) Flat surface of the screen
    3) Non coincident convergence plane

30. What are the different types of convergence? The two types of convergence are

    1) Static convergence which involves the movement of beam by permanent magnetic field. This is used to converge the three beams in the central area of the screen.
    2) Dynamic convergence which involves the movement of beam by a continuously varying magnetic field.

31. What is Frequency interleaving?

It is the technique used to send the colour information with the monochrome signal without any disturbance.

32. What are weighting factors?

To avoid over modulation, we have to reduce the amplitude of colour difference signal before modulation with sub carrier. To achieve this, the R-Y & B-Y components magnitudes are reduced by multiplying them using a value called as weighting factors.

33. What is the weighting factors used for (R-Y) & (B-Y) signals?

R-Y -- 0.877
B-Y -- 0.493

34. Why is the colour signal BW requirements much less than that of Y signals?

For very fine details, the eye cannot able to identify the colours but identify only the brightness. Therefore for colour transmission a maximum of 3 MHz BW is enough.

35. What is chroma signal phase diagram?

The diagram which indicates the amplifier & phase angle of colour signal is known as chroma signal phase diagram.

36. What are Ident pulses?

'Ident' are the line identification pulses used to identify the proper sequence of colour lines in each field.