

Shree Datta Shetkari Sahakari Sakhar Karkhana Trust's
Shree Datta Polytechnic, Dattanagar, Shirol
Model Answer Paper of CLASS TEST-2
Class: Third Year Diploma in Electronics and Telecommunication
Subject: Audio Video Engineering

Q1. Attempt any THREE of following (3*3)

a) Explain why G-Y colour difference signal is not chosen for transmission?

ANS: G-Y colour difference signal is not chosen for transmission because

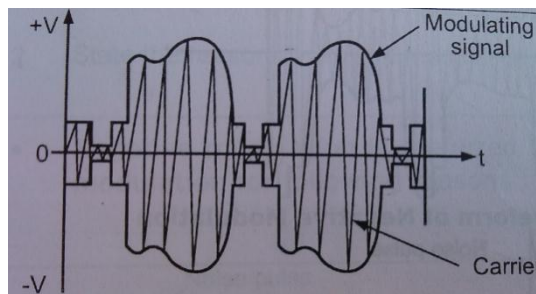
- The proportion of G in Y is relatively large (59%) and hence the amplitude of (G-Y) is small in comparison with (R-Y) and (B-Y). This causes signal to noise ratio problem at transmitting end.
- As (G-Y) is small, it becomes necessary to use amplifiers in the matrix network to recover other colours at receiving end.

There are no such problems with (R-Y) and (B-Y) and hence they are chosen for transmission.

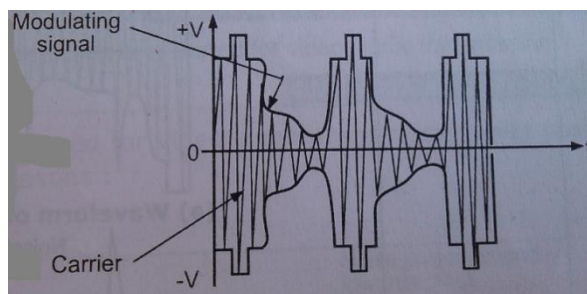
b) Define positive and negative modulation.

ANS: (Definition: 1.5 marks, Diagram: 1.5 marks)

Positive Modulation: When increase in brightness of picture produces increase in amplitude of modulated envelope then it is called as 'positive modulation'.



Negative Modulation: When increase in brightness of picture produces decrease in amplitude of modulated envelope then it is called as 'negative modulation'.



c) List and explain merits and demerits of negative modulation.

ANS:

- Merits of Negative Modulation:

- 1) Effect of noise interference on picture signal:

- When the noise gets added in the form of pulse to carrier amplitude, it increases carrier amplitude. In of Negative Modulation, noise pulse goes towards black level and produces black spot which is less noticeable against gray background.

- 2) Saving of power at transmitter side:

- In of Negative Modulation picture having high brightness level produces less modulation of carrier which saves the transmitting power.

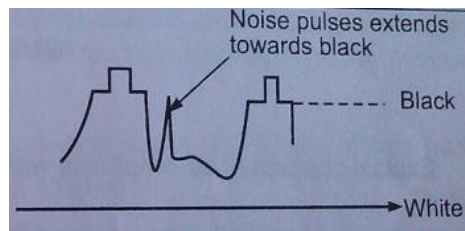
- 3) Reference level for AGC circuit in receiver:

- AGC circuits in receiver measures peak level of modulated signal and accordingly adjusts the gain of IF and RF amplifier.
- In Negative Modulation, peak level is at 100% which is sync level and it is stable. Whereas in of Positive Modulation, peak level is not stable. Hence Negative Modulation is used in AGC circuit.

- Demerits of Negative Modulation

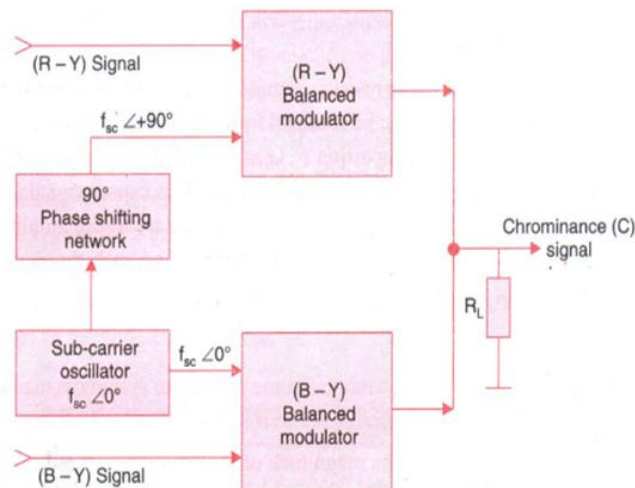
- 1) Effect of noise interference on synchronization:

- In Negative Modulation, sync pulses are at blacker than black level. If noise arises, then it also comes in black level which causes synchronization trouble. Hence horizontal stabilizing circuits must be used.



d) Draw the block diagram of Quadrature Modulator used in colour transmitter.

ANS:



Q2. Attempt any TWO of following (2*4)

a) Describe construction and working of vidicon camera tube.

ANS: (Construction: 2marks, Working: 2marks)

Construction:

- The target consists of a thin photoconductive layer of either selenium or antimony compounds.
- The inner surface of faceplate is coated with the transparent conducting field.
- The electron beam is focused on surface of photoconductive layer by magnetic field of coil and electrostatic field of Grid No.3
- Deflection of beam to scan the target is obtained by vertical and horizontal deflection coils.
- Alignment coils are used to align the beam parallel to tube axis so that it lands perpendicular on the target.

Working:

- The image side of photo layer which is in contact with conductive coating is connected to DC supply through load resistor R_L .
- The beam that emerges from the electron gun is focused on surface of photoconductive layer.
- As the beam scans the target plate, there is a change in potential on each element of layer which causes a current flow in the conductive coating.
- It produces a voltage across R_L which is directly proportional to light intensity variation on screen.
- Thus the captured image is converted into electrical signal by vidicon camera tube.

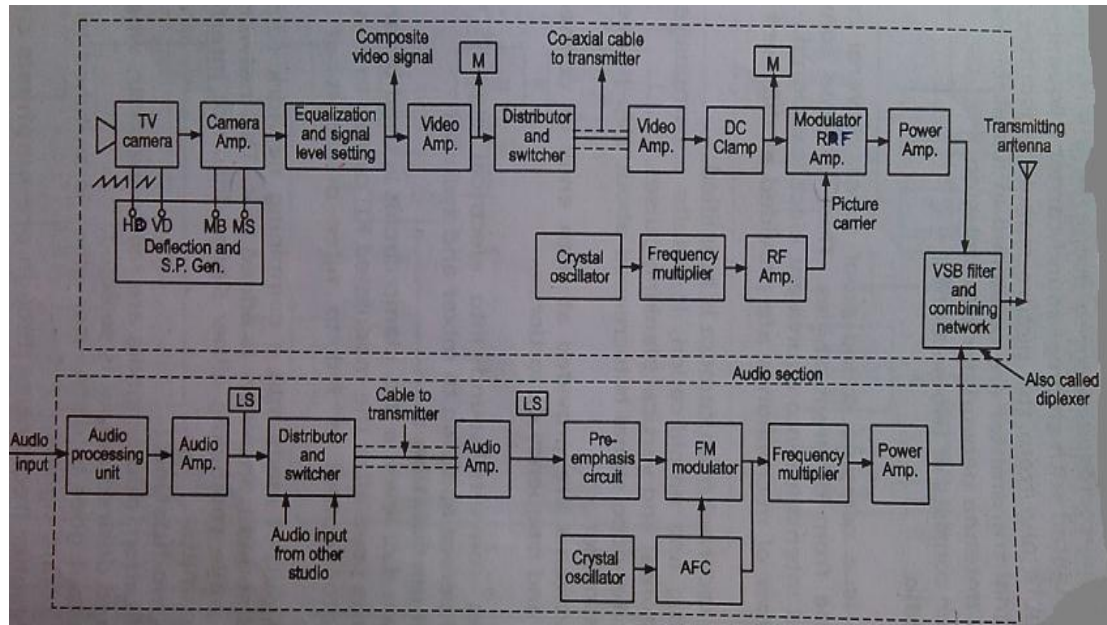
b) Compare NTSC, PAL and SECAM system.

ANS: (Any 4 points-4marks)

Sr. No.	System Standard	NTSC	PAL	SECAM
1.	Full Form	National Television Systems Committee	Phase Alteration by Line	Sequential a memory
2.	Type of chrominance modulation	AM	AM	FM
3.	Lines scanned	525	625	625
4.	Line frequency	15734.264Hz	15625Hz	15625Hz
5.	Field Frequency	60Hz	50Hz	50Hz
6.	Channel Bandwidth	6MHz	7MHz	8MHz
7.	Colour Subcarrier Frequency	3.58MHz	4.43MHz	FR = 4.41MHz FB = 4.25MHz
8.	Video Bandwidth	4.5MHz	5.5MHz	5.5MHz
9.	Phase of burst	180°	135°	-
10.	Countries where used	USA, Canada, Japan etc.	India, UK, Australia etc.	France, Russia, Hungary etc.

c) Draw block diagram of monochrome (B/W) TV transmitter.

ANS:

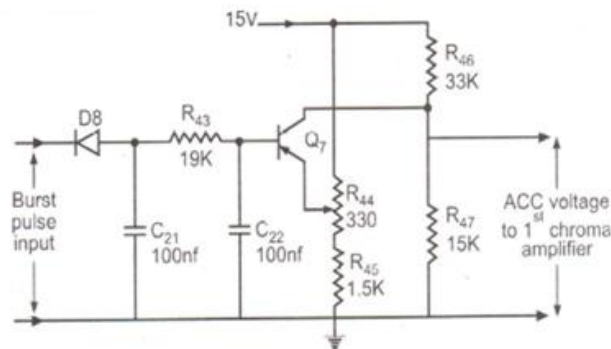


Q3. Attempt any TWO of following (2*4)

a) Draw circuit diagram and explain the working of ACC amplifier.

ANS: (Diagram: 2marks, Explanation: 2marks)

Diagram:



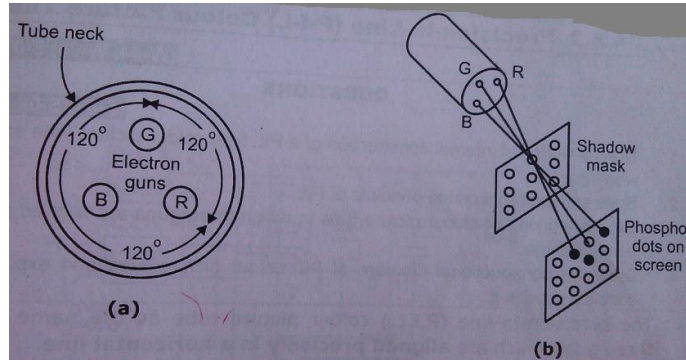
Explanation:

- ACC amplifier is shown in above fig.
- A burst pulse is fed to the circuit through rectifier and filter circuit. Here diode acts as rectifier which provides negative DC voltage which is proportional to amplitude of received signal. A circuit of resistor and capacitors C_{21} and C_{22} forms filter.
- Output of transistor Q_7 is positive voltage which changes with amplitude of chroma signal. It is given to first chroma amplifier to control its gain.
- Resistor R_{44} provides adjustable reverse bias for Q_7 .

b) Draw and explain delta gun picture tube.

ANS: (Diagram: 2marks, Explanation: 2marks)

Diagram:



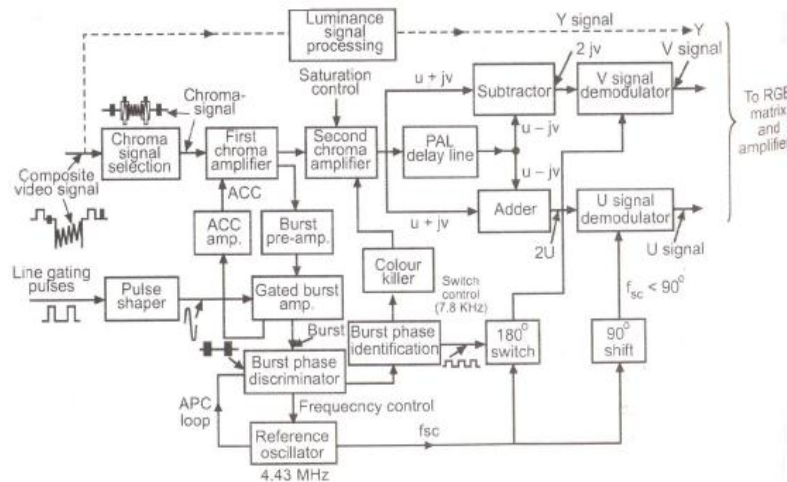
Explanation:

- The delta gun picture tube is shown in above fig.
- It has three separate guns one for each phosphor dot.
- The guns are equally spaced at 120° interval with respect to each other. Thus they form an equilateral triangle forming the capital Greek letter Delta. So, the name of this picture tube is Delta gun picture tube.
- A thin metal sheet known as shadow mask is located 1cm behind the picture tube screen. The mask has 1 hole for every phosphor dot triad on screen. The holes of mask are so designed that electrons of three beams on passing through any hole will hit only the corresponding colour phosphor dot on screen.
- The dots of Red, Green and Blue phosphors in triad glow simultaneously. The intensity of glow is proportional to intensity of video signal.

c) Draw the circuit diagram of PAL-D decoder. Explain the working of colour killer circuit.

ANS: (Diagram: 3marks, Explanation: 1marks)

Diagram:



Explanation of Colour Killer Circuit:

As the name suggests this circuit becomes 'ON' and disables the chroma amplifier during monochrome reception. Thus it prevents coloured interference on the screen.