

**SECTION E****(46 MARKS)**

1. Television sets used to have vertical and horizontal hold control knobs that could be adjusted by the user to stop the picture from rolling. **(2 marks)**
  
2. The intercarrier method is a system in television that reduces the cost of transmitters and receiver sets by processing audio and video signals together and minimizing the number of separate stages for audio and video signals. **(2 marks)**
  
3. The power is applied to the receiver and voltages are applied to different circuits in the receiver including the high voltage supply. When the voltage is applied to the heater, it heats the cathode which then emits electrons. A cloud of electrons is formed above the cathode which then shaped into a beam of electrons by the electron gun. For a colour television receiver there are three beams formed and accelerated to hit the phosphor dots on the screen. This action causes the screen to light and at the same time the vertical and horizontal deflection circuits are both energized and the electron beams move horizontally in its scanning motion and retrace motion horizontally and vertically. The screen is then display what is called the raster on the screen. **(5 marks)**

4)

$$N_T = 625$$

$$N_A = 625 - 60 = 565$$

$$R_V = 565 \times 0.7 = 395.5$$

$$R_H = 395.5 \times 4/3 = 527$$

$$N_L = 30 \times 2 = 60$$

**(1 marks)****(0.5 marks)****(0.5 marks)****(1 marks)**

- 5) The fault would be in the T-con Board. Replace T-con Board. **(2 mark)**
  
- 6) Delta – Gun picture tube employs three separate guns, one for each phosphor. The guns are equally spaced at  $120^\circ$  interval with respect to each other and tilted inwards in relation to the axis of the tube. **(1 mark)**  
Precision – In – Line picture tube has three guns which are aligned precisely in a horizontal line. **(1 mark)**  
Trinitron picture tube employs a gun having three – in – line cathodes. **(1 mark)**

7) Weak or faded color can result from an improperly adjusted bias control on the picture tube or improperly adjusted screen and drive controls. A weak transistor or IC in the I and Q signal processing stages or defects in the band pass amplifier may also cause the problem. The tuner and I.F. stages may be slightly out of alignment or could contribute to the problem. Check for the presence of the 3.58-MHz signal and the color burst signal at the oscillator and subcarrier amplifier. **(2 marks)**

8) Bias the blue and green guns to cut off and slide the deflection yoke forward. Adjust the purity magnets until the red focuses exactly in the middle of the picture tube. Now push the deflection yoke backward until the raster is completely red. **(2 marks)**

9.  $N_v$  = total number of lines (elements) to be resolved in the vertical direction

$\alpha$  = minimum resolving angle, (rad),  $\rho$  =  $D/H$  = viewing distance/picture height = 4

$$\alpha = \frac{1}{60} \times \frac{\pi}{180} \quad \text{(0.5 mark)}$$

$$N_v = \frac{1}{\alpha \rho} \quad \text{(0.5 mark)}$$

$$= \frac{1}{\frac{1}{60} \times \frac{\pi}{180} \times 4} \quad \text{(0.5 mark)}$$

$$= 860 \quad \text{(0.5 mark)}$$

10. Safe working practices are :- **(any five of these)**

- (i) work carefully and attentively
- ii) know the location of the Class C fire extinguishers
- (iii) know location of circuit breakers
- (iv) know the location of the first aid equipment
- (v) report all injuries to supervisors immediately
- (vi) post special signs that explain safety hazards
- (vii) familiarize with location and procedures.

**[5 marks]**

11a) Impedance is the property or characteristic of a circuit to oppose or impede the signal applied to the circuit for processing. The tuner input impedance is normally 75 ohms then there is no need of a matching circuit. But if there is a difference, then a balun transformer is often used. The balun is a device that matches a 300 ohms impedance to the 75 ohms impedance. **(3 marks)**

b) The input device is the antenna and the function is to convert electromagnetic change or energy to electrical energy or change. **(2 marks)**

c) Select the wanted signal. **(0.5 mark)**

Amplify the wanted signal. **(0.5 mark)**

Convert the selected signal to a lower frequency called the intermediate frequency by use of heterodyne effect. **(1 mark)**

12. (i) protect yourself when servicing video equipment

(ii) wear eye protection whenever solder

(iii) wear eye protection when use spray cans

(iv) wear eye guards when work on CRT

(v) remove all metals jewelry form hands

(vi) use the proper tools

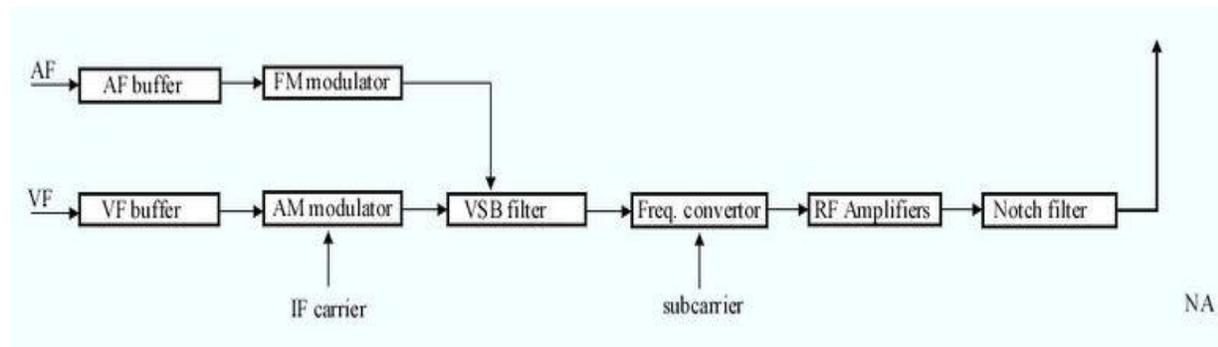
(vii) cut away form your body

(viii) avoid placing sharp tools in your pocket

**(Any five from above)**

**(5 marks)**

13.



- a) AF (0.5 mark)
- b) AF buffer (0.5 mark)
- c) FM modulator (0.5 mark)
- d) VF (0.5 mark)
- e) VF buffer (0.5 mark)
- f) AM modulator (0.5 mark)
- g) IF carrier (0.5 mark)
- h) VSB filter (0.5 mark)
- i) Frequency converter (0.5 mark)
- j) Subcarrier (0.5 mark)
- k) RF Amplifier (0.5 mark)
- l) Notch filter (0.5 mark)