

GOVERNMENT POLYTECHNIC COLLEGE BHILWARA

I MID TERM: 30<sup>TH</sup> November 2017

II- Year Electronics- EL 208

Maximum Marks: 15

Attempt all questions/ सभी प्रश्नों का उत्तर देना अनिवार्य है

**SHORT ANSWER QUESTIONS (All questions of 1 mark)**

1. What is the frame frequency in a television system and Motion Picture system?
2. What is the frequency of the horizontal and vertical scanning oscillator in a television system?
3. What are the number of horizontal lines lost during vertical retrace?
4. What are the trace and retrace times in horizontal scanning?
5. How many fields are there in 1 frame in a monochrome system?

**LONG ANSWER QUESTIONS**

6. What is the comfortable viewing distance in a TV system [3 marks]
7. What do you understand by **Contrast Ratio**? [3 marks]
8. What is resolution? Explain vertical resolution and horizontal resolution in a television system [4 marks]

## SOLUTIONS

1<sup>st</sup> Mid-Term (EL-208) (30/11/2017)

① Since in Television systems in one second 25 frames are scanned, hence for TV systems frame frequency is 25 Hz  
Similarly for motion picture the frame frequency is 24 Hz

② Frequency of horizontal oscillator = 15625 Hz  
vertical oscillator = 50 Hz

③ Number of lines lost per field during retrace = 20  
Number of fields per frame = 2  
hence number of lines lost during vertical retrace = 40

④ For horizontal scanning trace time is the time taken by the beam to go from extreme left to right once.  
This time is 52  $\mu$ sec  
Retrace time is the time taken by the beam to go from right to left on the raster. This time is 12  $\mu$ sec

⑤ In one frame there are 2 fields in monochrome system

⑥ Comfortable distance is the distance at which the picture height subtends an angle of 15° at the eye.  
This distance is 3 to 8 times the height of the picture.

⑦ The ratio of maximum to minimum brightness relative to the original picture is called contrast ratio.

→ In broad daylight the variations in brightness are very wide with ratio of 10,000:1

→ In picture the contrast ratio can only be upto 50:1 or maximum 100:1

→ Eyes cannot adjust to contrast ratio of 10:1

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## ⑧ Resolution

The ability of the image reproducing system to represent the fine structure of an object is called its resolving power or resolution

### Vertical Resolution

The extent to which the scanning system is capable of resolving picture details in vertical direction is called as vertical resolution

→ The vertical resolution in 625 line system is:

$$V_v = n_a \times k$$

where  $n_a =$  no. of active lines

$k =$  kell factor (resolution factor)

assuming optimum value of  $k = 0.69$

$$V_v = 585 \times 0.69$$

$$V_v = 400 \text{ lines}$$

## Horizontal resolution

The capability of the system to resolve maximum number of picture elements along scanning lines is called its horizontal resolution.

→ For equal horizontal and vertical resolution, the same resolution factor may be used.

Hence,  $N = \text{Alternate no of alternate black and white segments}$

$$N = N_a \times \text{Aspect ratio} \times K$$

$$N = 585 \times \frac{4}{3} \times 0.69$$

$$N = 533$$

This 533 is the number of alternate black and white segments in one horizontal line.

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(P. D. Upadhyay)