

Física para Ciências Biológicas – 4310190 – 2022

Lista de sala - 7

1)

$$a) \theta = \frac{1,22\lambda}{d}, d=30000\text{nm}$$

$$\lambda_{\text{azul}} = 483,5\text{nm},$$

$$\theta = \frac{1,22\lambda}{d} = \frac{1,22 \cdot 483,5}{30000} = \frac{589,87}{30000} = 0,01966 \text{ radianos} * \left(\frac{180}{3,14}\right) = 1,13\text{graus}$$

$$\lambda_{\text{verde}} = 543,5\text{nm},$$

$$\theta = \frac{1,22\lambda}{d} = \frac{1,22 \cdot 543,5}{30000} = \frac{663,07}{30000} = 0,0221 \text{ radianos} * \left(\frac{180}{3,14}\right) = 1,27\text{graus}$$

$$\lambda_{\text{amarelo}} = 589,0\text{nm},$$

$$\theta = \frac{1,22\lambda}{d} = \frac{1,22 \cdot 589}{30000} = \frac{718,58}{30000} = 0,0240 \text{ radianos} * \left(\frac{180}{3,14}\right) = 1,37\text{graus}$$

$$\lambda_{\text{vermelho}} = 676,5\text{nm},$$

$$\theta = \frac{1,22\lambda}{d} = \frac{1,22 \cdot 676,5}{30000} = \frac{825,33}{30000} = 0,0276 \text{ radianos} * \left(\frac{180}{3,14}\right) = 1,58\text{graus}$$

$$b) x = 2 * L * \tan\left(\frac{\theta}{2}\right), n=1 \quad L=2,30\text{m}=230\text{cm}$$

$$\lambda_{\text{azul}} = 482,5\text{nm}, \quad x = 2 * L * \tan\left(\frac{\theta}{2}\right) = 2 * 2,3 \tan\left(\frac{0,01966}{2}\right) = 4,54\text{cm}$$

$$\lambda_{\text{verde}} = 543,5\text{nm}, \quad x = 2 * 2,3 * \tan\left(\frac{0,0221}{2}\right) = 5,10\text{cm}$$

$$\lambda_{\text{amarelo}} = 589\text{nm}, \quad x = 2 * 2,3 * \tan\left(\frac{0,0240}{2}\right) = 5,51\text{cm}$$

$$\lambda_{\text{vermelho}} = 676,5\text{nm}, \quad x = 2 * 2,3 * \tan\left(\frac{0,0276}{2}\right) = 6,34\text{cm}$$

$$2) \lambda = 672 \text{ nm} \quad L = 1,5 \text{ m} \quad x = 1,3 \text{ cm}$$

$$b = \frac{\lambda L}{x} \quad b = [672(\text{nm}) \cdot 1,5(\text{m})] / 0,013\text{m} = 77,5 \mu\text{m}$$

3)

$$x_n = n \frac{\lambda L}{b} \rightarrow \lambda = \frac{b \cdot x}{L} = \frac{54 \cdot 10^{-6} \cdot 10^{-2}}{1} = 540 \cdot 10^{-9} \text{ m} = 540 \text{ nm}$$

Ou seja, a cor incidente na fenda é a verde.