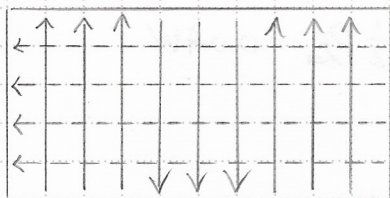


五.

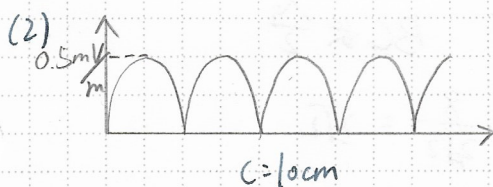
(1) 该电磁波为 TE_{30} 模式

$$\text{则 } \lambda_c = \frac{2\pi c}{\sqrt{(\frac{3\pi}{a})^2}} = \frac{20}{3} \text{ cm}$$

$$\text{则 } f_c = \frac{v}{\lambda_c} = \frac{3 \times 10^8}{\frac{20}{3} \times 10^{-2}} = 4.5 \times 10^9 \text{ Hz}$$



其中实线为电场线
虚线为磁场线



$$(3) \lambda_{c2} = \frac{v}{f_c} = 2\lambda_c = \frac{40}{3} \text{ cm}$$

$$\text{使 } \frac{2}{\sqrt{(\frac{m}{a})^2 + (\frac{n}{a})^2}} > \lambda_{c2} \Rightarrow \begin{cases} m=1 \\ n=0 \end{cases} \Rightarrow \text{仅可通 } TE_{10} \text{ 模}$$