電磁波與天線導論 HW4

ID: R10522845

Name:郭忠翔

1

(a)

$$egin{align} f &= w/2\pi = 3*10^9 (Hz) \ u_p &= rac{c}{\sqrt{\epsilon_r}} = 1.875*10^8 (m/s) \ \lambda &= rac{u_p}{f} = 0.03125 (m) \ k &= rac{2\pi}{\lambda} = 201.06 (rad/m) \ \eta &= rac{\eta_0}{\epsilon_r} = rac{377}{\sqrt{2.56}} = 235.625 \ \end{array}$$

(b)

$$H(z,t) = \hat{y} rac{E(z,t)}{\eta} = \hat{y} 0.021 cos(6\pi*10^9 t - 201.06z)$$

2

$$E(z,t)=\hat{x}\sqrt{2}cos(wt+kz)-\hat{y}\sqrt{2}sin(wt+kz), \quad where$$
 $k=rac{2\pi}{\lambda}=rac{2\pi}{0.03}=209.44(rad/m)$ $w=kc=6.28*10^9(rad/s)$

$$lpha=eta=\sqrt{\pi f\mu\sigma}=6.28*10^{-4}$$
 $u_p=\sqrt{4\pi f\mu\sigma}=10^7(m/s)$ $\lambda=u_p/f=10^4(m)$ $\eta_c=(1+j)rac{lpha}{\sigma}$