

Assignment - 13

Q-3-11)

a) from Eq (9-72)

$$\epsilon_{ap} = \frac{G}{A_p} \frac{\lambda^2}{4\pi}$$

=> given Gain  $G = 15.5 \text{ dB}$

$$A = 185.5 \times 10^{-2} \text{ m}^2$$

$$P = 137.4 \times 10^{-2} \text{ m}^2$$

$$\lambda = \frac{c}{f} = \frac{3 \times 10^8}{440 \times 10^6}$$

$$\text{So } \epsilon_{ap} = \frac{10^{15.5/10}}{(185.5 \times 10^{-2})(137.4 \times 10^{-2})} \frac{3.8 \times 10^8}{440 \times 10^6} \frac{1}{4\pi}$$

Aperture efficiency  $\epsilon_{ap} = 0.499$

b) Gain  $G = 26000$

$$HPE = HP_{H^0}$$

$$= \frac{26000}{(30)(27)}$$

$$= 15.1 \text{ dB}$$

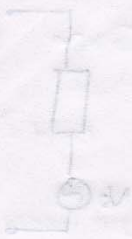
9.3-13)

Eq 9.95

$$G = \frac{26000}{HP_{E^0} HP_{H^0}}$$

$$= \frac{26000}{12.5 \times 12.5}$$

$$= 22.2 \text{ dB}$$



Eq 9.95

$$G = 5.43 \frac{D^2}{\lambda^2}$$

$$= 5.43 \frac{3.66^2}{0.652^2}$$

$$= 22.3 \text{ dB}$$