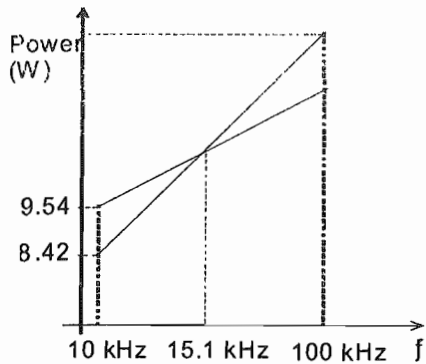


List of Numerical answers

Question 1

b) $MOS : 7.5 + 243.75 \times 10^{-6} f$
 $IGBT : 3 + 542.4 \times 10^{-6} f$



Question 2

b) $V_{Breakover} = 170.83 \text{ V}$

Question 4

b) (i) $N_D = \frac{\epsilon_0 \epsilon_r E_{CR}^2}{2qV_{BR}}$ and $w = \frac{2V_{BR}}{E_{CR}} \Rightarrow w_{drift} = w = \frac{\epsilon_0 \epsilon_r E_{CR}}{qN_D}$ for the Power MOSFET

$$w_{drift-CoolMOS} = \frac{w_{drift-MOSFET}}{2}$$

b) (ii) $\frac{R_{spCoolMOS}}{R_{spMOSFET}} = \frac{1}{10} \times 3 \times \frac{1}{2} = \frac{3}{20} = 0.15$