# Exercise 1

**Task 1. Explain the basic idea of the three general modes of wireless propagation.**

**Task 2. Compare briefly the VLF, HF and VHF frequency ranges, in terms of their propagation properties and wireless communication applications.**

**Task 3. Calculate the following conversions:**

**(a) 2 (power ratio) = ? dB**

**(b) 1/2 (power ratio) = ? dB**

**(c) 4.77 dB = ? (power ratio)**

**(d) 2 (voltage ratio) = ? dB (assume equal impedances)**

**(e) 1 mW = ? dBm**

**(f) 43 dBm = ? W**

**(g) 10 dBm = ? $V_{rms}$ (across 50 Ω impedance)**

**(h) −100 dBm = ? $V_{rms}$ (across 50 Ω impedance)**

**(i) 33 dBm + 33 dB = ? dBm**

**(j) 33 dBm + 33 dBm = ? dBm**