Assignment 5

The due date for submitting this assignment has passed.

1) Choose the correct conditions for being in a level electronic system.

\[
E_n > E_0 > E_T > E_T, \\
N_0 > N_1, \text{ and } N_2 > N_3
\]

Where \( n \) and \( T \) represent number of atoms and lifetime of a particular energy level respectively.

\[
N_1 > N_2 > N_3 < T_1 < T_2
\]

2 points

Consider a fiber Bragg grating of length 30 cm with real indices of refraction 1.86 and 1.88. The central wavelength of the cavity is given as O.6568 μm with an FWHM line width of 0.9 GHz. Background loss coefficient of the medium is given as 0.5dB/cm. Final

Wave length (the number of frequency maxima in the cavity, or the central wavelength) is __________

3 points

4) Distance between two consecutive modes is __________ MHz

4 points

5) Number of modes expected in the cavity is __________

4 points

6) Theoretical gain (assuming uniform excitation along the length of the doped fiber) is __________ dB

6 points

7) The small signal gain coefficient of 1800 km is __________ dB

6 points

8) The length of the fiber required to achieve 30 dB gain is __________ m

6 points

Figure 1

- The small signal gain coefficient of 1800 km is __________ dB
- The length of the fiber required to achieve 30 dB gain is __________ m