Exercise for Chapter4_2

The KMZ10B is a magnetoresistive sensor which is linearized and adjusted to zero by the manufacturer (see data sheets attached). It will be used here to measure AC current in the range of ± 20A (50Hz-60Hz) by positioning it at 1.5 mm from a conducting cable and detecting the magnetic field induced (see the data at the end of the question).

For conditioning the following circuit block diagram is used (figure 2):

- Zero adjustment (R1).
- Compensation of the deviation of the sensitivity with temperature (PTC R6).
- Adjustment of the sensitivity (R12).

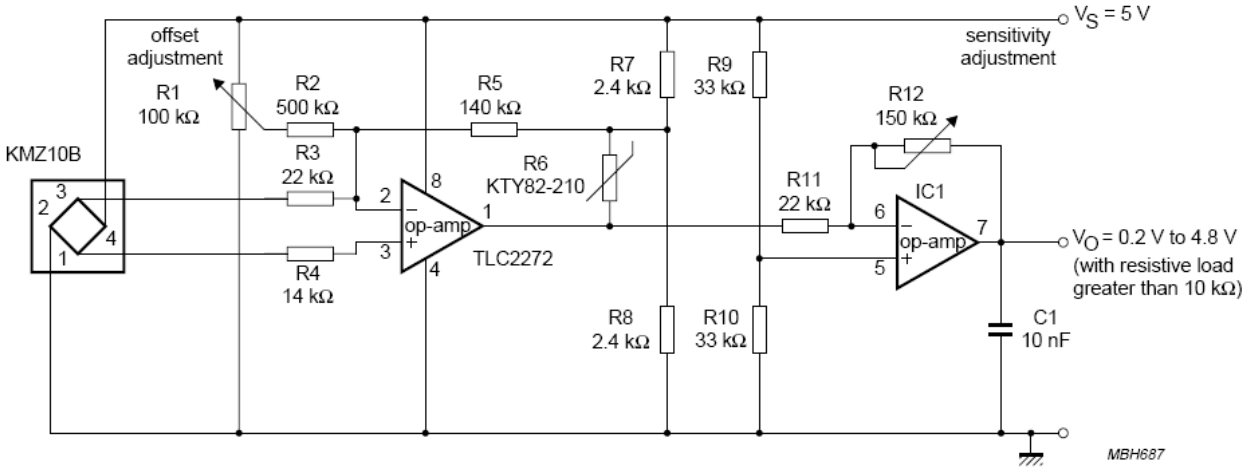

Figure 2

1) Calculate the range of values at the output of the sensor KMZ10B for this application.
2) Show that if the value of the position R1 is centred then the output is Vo=2.5V in equilibrium.
3) Calculate the value that the variable resistance R12 must have in order to obtain an output Vo between 0.2V and 4.8V for nominal temperature conditions (25ºC).

DATA:

MAGNETIC FIELD INDUCED IN AIR

Relation[1]: $H = \frac{i}{2\pi d}$

Example:

Current (i)	Distance (d)	Magnetic Field (H)
1 A	0.5 mm	318 A/m

[1] Magnetic field "H" present in the air at a distance "d" of the conducting cable which has current flowing through it "i".

KTY82-210

Nominal Resistance (25ºC) $2\ k\Omega$