# Electronics laboratory report.

Laboratory Long report. Electronic laboratory practice Abstract: The aim of this laboratory was to make us familiar with how to use the different types of electronic equipment and how to accurately use them to make measurements. The equipment used in this laboratory included: (i) the signal generator which was used to supply the power used in the various procedures, (ii) The oscilloscope which was used to view and record the waves produced from the AC currents and then make relevant calculations based on that. iii) The DC power supply was used in the first two procedures which involved using the resistors. (iv) Familiarised with the multimeter and used it to take measurements (v) the experiment board which was used to do create most of the circuits and take the necessary measurements. Procedure 1: The measurement of resistance. The resistances of the 5k? and 22k? resistors were found using the theory and by taking the actual readings. The resistances of the resistors were first measured by comparing the colour bands on the resistors to the colour code chart provided.

The procedure for this is: there are four bands on each of the resistors, and each colour on the band denotes a specific number on the resistor colour code chart, which gives us the significant figure and the multiplier which is in powers of 10. The values using the colour code were calculated and found to be as follows. * 5. 1k? with a ±5% tolerance * 21k? with ±10% tolerance. These nominal values are the ones that are calculated but in reality the actual values of resistance can be a bit different from the ones calculated due to impurities.

The actual resistances are measured by using a multimeter, the way this is done is that the resistors are mounted on an experiment board and then the

multimeter is connected right across it. The values were recorded and found to be as follows: * 5. 037k? * 21. 047k? | Nominal value| Actual value| 5k? resistor| 5. 1k? ±5% tolerance| 5. 307k? | 22k? resistor| 21k? ±10% tolerance| 21. 047k| In conclusion, it can be seen that there was a difference in the calculated nominal values of the resistors and the actual ones which were calculated.

But they were still within their tolerance levels; there could be plenty of reasons for that which might include different types of batteries, differences in temperature of the room, impurities in different sections of the experiment board which might have affected the readings. ’ The tolerance level is defined as an allowable variation from a predefined standard. A value from an experiment or a variance is not considered significant unless it exceeds the limit set by the tolerance limit. ’ - www. bridgefieldgroup. om/bridgefieldgroup/glos9. htm For this reason, we can assume these differences in the actual values of the resistors to be insignificant since they were within the stated tolerances. Procedure 2: The measurement of voltage. In this experiment, the principle was to create a voltage divider circuit and to carry out the required measurements were undertaken to prove the principle of the voltage divider. For that, a circuit was created where a supply voltage was applied across two resistors R1 and R2 in series as shown in the figure below.

And the two equations shown below were used to make the necessary calculations. Image source: http://www. ermicro. com/blog/wp-content/uploads/2008/11/basic_r01. jpg http://diy. griffshp. com/wp-content/VoltageDivider. jpg The experiment was carried by using

two resistors of values R1 equal to 5k? and R2 equal to 22k?. The resistors were mounted on the experiment board and the voltage divider circuit was created. The power was supplied using a +6v power supply and the voltages across each of the resistors was calculated using the Agilent 34401 multimeter.

The values were recorded and were found to be as follows: V1= 1. 1846v V2= 4. 89v The total of the voltages adds up to be 6. 0167v which is roughly about 6v ( the initial voltage supplied) which proves that the voltages are within the required tolerance. To compare these measured values to the nominal values which can be found using the voltage divider equation, substitute the values of R1 and R2 and use V as 6v to find the voltages across each of V1 and V2. v1= 6*55+22= 1. 11v * V2= 6*225+22= 4. 88v | Nominal values| Actual values| V1| 1. 11v| 1. 1846v| V2| 4. 88v| 4. 89v| In this experiment it was found that the actual values and the nominal vales were not much different from each other. This could have probably been because of the resistances in the wires or loose connections. But they were both within a tolerance level of 5% which makes the difference insignificant and accountable for experimental error.

The outcome of the experiment was that the voltages were shared between the two resistors and the larger resistor got the larger share of the voltage whereas the smaller resistance got the showed smaller voltage passing through it. This proved the values that we found using the nominal calculations of the voltages. Procedure 3: current measurement. In this experiment, we use the current divider rule which is similar to the voltage

divider equation except that the way the circuit is constructed is it is in parallel instead of series.

The experiment was set up in the method shown below and the necessary calculations were made. The circuit was constructed as shown in the schematic above and a DC voltage of +6v was passed through it, the currents were measured in each of the resistors and found to be: * I1(current across 5k? ) = 1. 182A * I2(current across 22k? )= 1. 192A (Ps: The rest of the rest of the report could not be completed since the original lab was not completed on time and hence the required information was missing. ) Table of Contents: 1. Procedure 1 2. Procedure 2 3. Procedure 3